Implementation Plan for the
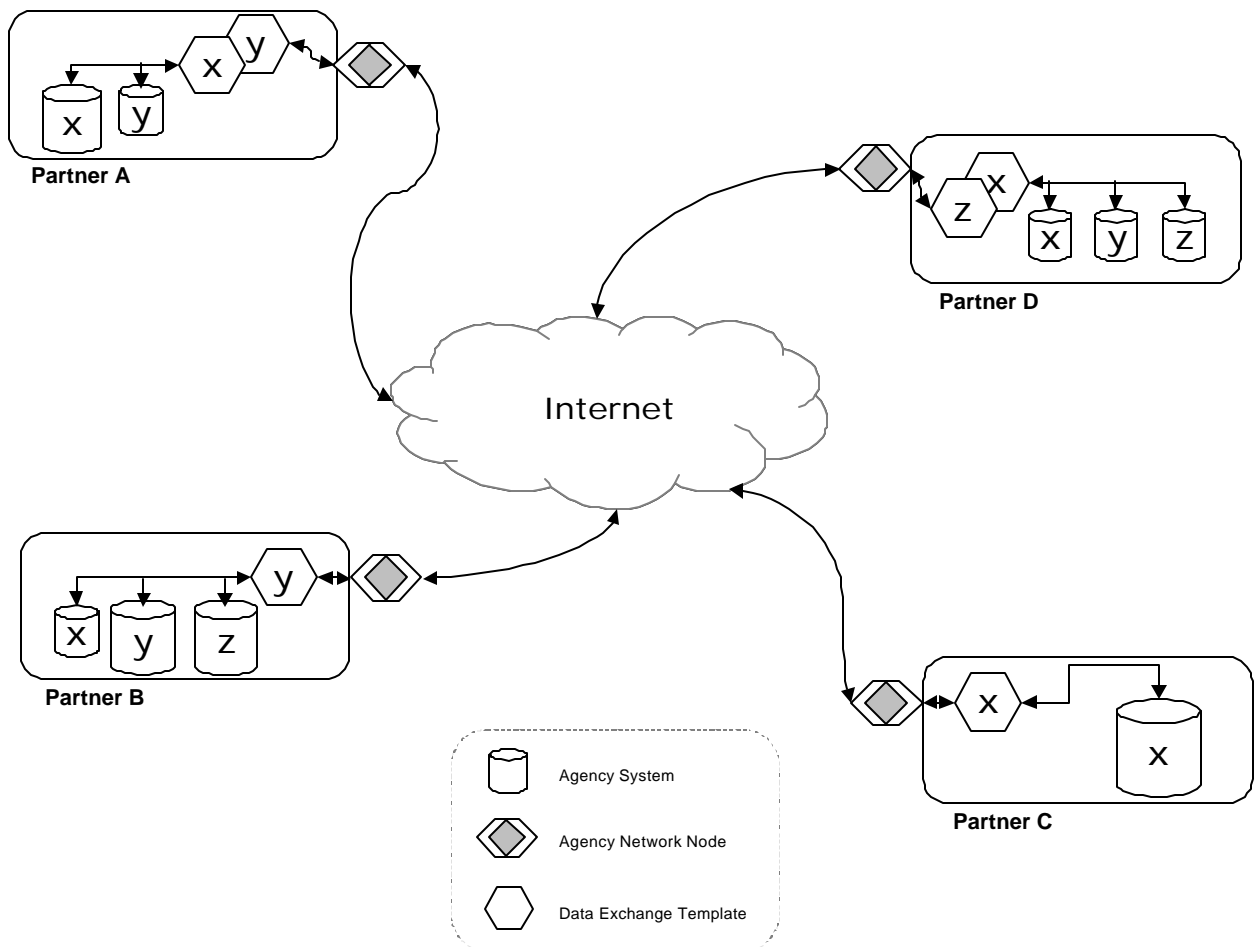# National Environmental Information
Exchange Network

Approved by the
State/EPA Information Management Workgroup
on February 12, 2002

Acknowledgments

IMWG Implementation Plan for the National Environmental Information Exchange Network
February 2002

Foreword

Upon request from the IMWG, the INSG prepared this Implementation Plan for the National Environmental Information Exchange Network. A previous document, *The Blueprint for a National Environmental Exchange Network* (drafted in 2000 and updated in 2001), provided the foundation for this Implementation Plan (Plan).

The Plan represents the best understanding of the activities and mechanisms that must be developed, supported, and managed to make the Network an ongoing reality. The dynamic nature of Network development requires this Plan to be flexible and allow for both the evolution of Network Partners' understanding and the development and improvement of Network technologies. As such, many of the organizational tools, technical tools, and milestones will require ongoing development, monitoring of advances, and reliance on the coordinated, but not centrally-managed, activities.

To address the immediate need to share environmental data and take advantage of the "window of opportunity" presented by the current state of technology, this Plan's timeline is very aggressive. The IMWG must support immediate action to enable the Plan to become a reality. Further, in some cases, this Plan outlines how Network implementation work must commence prior to the Network Steering Board's first meeting in March 2002.

IMWG Implementation Plan for the National Environmental Information Exchange Network
February 2002

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Acronyms and Abbreviations

ADO	Active Data Objects
AIRS AQS	Aerometric Information Retrieval Air Quality Subsystem
AFS	AIRS Facility Subsystem
Beta Phase	Network Node Pilot Project – Beta Phase
Blueprint	Blueprint for a National Environmental Information Exchange Network (Blueprint)
Board	Network Steering Board
BRS	Biennial Reporting System
CDX	Central Data Exchange
DTDs	Document Type Definitions
EbXML	Electronic Business XML Initiative
EDMR	Electronic Discharge Monitoring Reports
EDSC	Environmental Data Standards Council
EPA	Environmental Protection Agency
FRS	Facility Registry System
HTML	HyperText Markup Language
HTTP	HyperText Transfer Protocol
HTTPS	HyperText Transfer Protocol Secure
IDEF	Interim Data Exchange Format
IMWG	State/EPA Information Management Workgroup
INSG	Interim Network Steering Group
JDBC	Java Database Connectivity
MIME	Multipurpose Internet Mail Extensions
NEI	National Emissions Inventory
Network	National Environmental Information Exchange Network
Network Grant Program	National Environmental Information Exchange Network Grant Program
Plan	Network Implementation Plan
NIST	National Institute of Standards and Technology
NPDES	National Pollutant Discharge Elimination System Program
OASIS	Organization for the Advancement of Structured Information Standards
PCS/IDEF	Permit Compliance System/Interim Data Exchange Format
RCRIS	RCRA Information System RCRAInfo
SDWIS	Safe Drinking Water Information System
SOAP	Simple Object Access Protocol
SSL	Secure Socket Layer
STORET	Water Quality Information System (STOrage and RETrieval)
Templates	Data Exchange Templates
TPAs	Trading Partner Agreements
TRG	State/EPA Technical Resource Group
UDDI	Universal Description Discovery and Integration
WSDL	Web Services Description Language
W3C	Worldwide Web Consortium
XKMS	XML Key Management Specification
XML	eXtensible Markup Language
XQL	Extensible Query Language

Executive Summary

The National Environmental Information Exchange Network (Network) is an innovative approach for the exchange of environmental data among the Environmental Protection Agency (EPA), States, and other parties with whom EPA and States exchange information. The Network "vision" is to promote access to and exchange of quality environmental data while reducing reporting burden and increasing the efficiency of data exchanges between Network Partners – the parties that officially participate in the Network. During the early Network implementation phase, "Network Partners" will include EPA, States, Tribes, and Territories. In the future, the term "Network Partners" is likely to include other governmental and possibly non-governmental parties. The Network will gradually replace the traditional approach to information exchange that requires States to feed data directly into multiple EPA national systems. The Network will also facilitate transparent and secure data exchanges that support specific analyses, such as the use of indicators for measuring environmental results. While Network participation is voluntary, EPA and States expect participation in the Network to become the preferred method for routine inter-governmental transfers of environmental data.

Since 1998, the State/EPA Information Management Workgroup (IMWG), Interim Network Steering Group INSG), Environmental Data Standards Council (EDSC), and several Network Action Teams have participated in the Network conceptualization and early implementation. These efforts have resulted in an understanding that the Network should be implemented according to five strategies: learn by doing, demonstrate success, act incrementally, be flexible, and commit to change. Today, Network implementation is in progress with six States and EPA exchanging facility data as part of the Network Node Pilot Project – Beta Phase. The pilot implementation has provided early "proof of concept" for the Network's organizational and technical frameworks. As these strategies suggest, Network implementation will not be a linear, point-by-point endeavor. Instead, Network Partners will have to carefully coordinate and learn from several simultaneously-occurring efforts. As such, this Network Implementation Plan (Plan) acknowledges that Network implementation will *evolve*.

Plan Objectives

In addition to summarizing the work on Network Implementation to date, this Network Implementation Plan (Plan) has the following objectives:

❑ Enable the IMWG to establish, provide direction to, and outline specific responsibilities for a Network Steering Board (Board).

❑ Outline the major activities (e.g., establishing Network Flows) needed to implement the Network's organizational and technical frameworks.

❑ Identify critical path milestones for each major activity. For each milestone, include the (likely) responsible party/parties and an approximate timeline.

Plan Audience

This Plan is intended for one primary audience: current or future Network Partners. However, within this broad audience, the Plan is geared for both decision-makers and information system managers. The Plan's Executive Summary and the section Overviews are intended for decision makers, while the more detailed text is geared for the information system managers. The milestones at the end of each section and summarized at the end of the document are likely to be of interest to both decision makers and system managers.

The Plan is divided into three Chapters: Network Organizational Framework, Network Technical Framework, and Summary of Network Implementation Milestones.

Network Organizational Framework

The Organizational Framework consists of the decision-making and operational structures for building, maintaining, administering, and guiding the Network. Specifically, the Organizational Framework consists of the following:

Guiding Network Implementation and Participation. The collaborative institutions that will have responsibilities for guiding Network implementation and participation include the following:

Highlight 1: High-Level Board Function Areas

- Network Registry and Repository

- Network Specifications, Guidelines, and Best Practices

- Technical Assistance to Network Partners

- Communication/Outreach

- Network Steering and Oversight

❑ The IMWG, which engages in overarching State/EPA information management issues, oversees Action Teams and the EDSC, and will guide the Network Steering Board.

❑ The Network Steering Board (Board), which will coordinate and guide Network implementation, support participants, and manage Network administration services. The Board's high-level function areas are shown in Highlight 1.

❑ The EDSC, which identifies, develops, and endorses environmental data standards.

Developing Network Flows. A Network Flow is defined as a routine use of the Network to satisfy a business need for exchanging specific information (and replace a legacy flow if one exists) between two or more Partners. Network Flows are defined by the specific data exchanged rather than by the technical details of the exchange process. Developing and managing Network Flows will require a significant amount of effort and coordination with Network Partners. This Plan provides a strategy for implementation of three Flow Types: Type 1 (State-EPA regulatory), Type 2 (Routine Bilateral), and Type 3 (Ad Hoc/Interactive). Highlight 4 lists the proposed Type 1 Flows, which would replace existing flows from States to EPA's national information systems.

Defining the Mutual Expectations for Data Exchanges: Trading Partner Agreements (TPAs). TPAs are documents that Network Partners agree upon for each Flow. They define what Flow(s) are exchanged, outline the stewardship and security expectations, and specify additional technical details for the exchange of information among two or more Network Partners. As of early 2002, two TPAs have been signed by EPA and States (Nebraska and Mississippi) and the INSG has started developing TPA guidelines. The Board will be responsible for publishing the first version of the TPA guidelines by the end of 2002.

Executive Summary

Defining the Responsibilities of Network Partners. All Network Partners will share responsibilities for Network implementation. Non-EPA Network Partners will establish Network Nodes and participate in exchanges according to specific Network guidelines and performance standards. Any additional contributions they decide to make to Network implementation are optional. However, to the extent practicable, each non-EPA Network Partner is both needed and expected to participate in the Network's collaborative institutions and implementation process. Those non-EPA Network Partners that wish to lead specific Network implementation efforts are strongly encouraged to do so; this leadership has been and will continue to be essential to Network success. EPA, on the other hand, must both lead and participate in most Network implementation efforts, especially those related to Type 1 Flows.

Identifying Network Resources. In 2002 and beyond, EPA, States, and other Network Partners will continue investing in the Network through internal EPA investments in Network development (including the support of EPA contractors), EPA support to other Network Partners for joint Network development and Network participation, and independent (non-EPA) Network Partner investments. In 2002 alone, the U.S. Congress appropriated $25 million in grant funds to develop the capacity of States, Tribes, and Territories to participate in the Network. Direct State investments will continue to be a critical source of Network resources.

Network Technical Framework

The linchpin to the Network's ultimate success is the commitment of Network Partners to help develop and abide by the Network's technical tools and conventions. To ensure that they build one (and only one) Network, Partners will have to collaborate closely. Efforts in the following technical areas will enable Network implementation to succeed:

Ensuring Network Security. Network security is complex and extremely important. This Plan does not attempt to resolve all security issues related to environmental data. Instead, the Network provides a generic framework of four security levels to secure Network Flows during the data exchange process. Network implementation will also require security of the Network technical infrastructure (i.e., Network Nodes and the Network Registry/Repository). The Board will be responsible for further identifying and addressing the Network's security needs.

Implementing Data Standards. Data standards are the documented agreements on data formats and definitions of common data. Data standards are especially important tools for data integration and exchange because they allow data from many compliant sources to be integrated. The benefits of data standards are even greater for Network Partners because they reduce ambiguity of the information contained in Data Exchange Templates (Templates) at the most rigorous level possible. The EDSC will continue to be the primary developer/adopter of data standards. Standards are especially important for large-scale integration and aggregation efforts such as those performed by EPA.

Developing Data Exchange Templates (Templates). Templates describe and enforce the format and specific restrictions, where applicable, of the data being exchanged across the Network. (Specifically, the Templates are either XML Document Type Definitions (DTDs) or XML Schema.) Network implementation requires not only that these Templates be developed and used, but also that their development and coordination be harmonized to ensure compatibility across Network Flows. Templates will continue to be developed as new data standards arise and existing standards are improved. The EDSC standards are available for Template developers to use and for assistance in developing the Template guidelines. Used together, the data standards and Templates will provide Partners with powerful tools for data access and integration. Developing Template guidelines is essential for Network implementation. (See Table 1 for the Template development schedule for Type 1 Flows)

Table 1: Draft Template Schedule for Type 1 Flows

Data/Business Area	System	Initial Target Date for Draft Template Development
Air Emissions Estimates	National Emissions Inventory (NEI)**	Draft Template established
Water (NDPES) Permit, Enforcement, Compliance and Discharge Data	Permit Compliance System (PCS)**	Templates in testing now (including IDEF and eDMR)
Ambient Water Quality Monitoring Data	Water Quality Information System (STORET)**	Draft Template established
Facility Identification Data*	Facility Registry System**	Draft Template established
Public Water Supply Testing and Violation Data	Safe Drinking Water Information System (SDWIS)	Q1 2003
Resource Conservation and Recovery Act Data	RCRA Information System (RCRIS) RCRAInfo**	Site ID Form under development
Air Quality Monitoring Data	Aerometric Information Retrieval Air Quality Subsystem (AIRS AQS)**	Q1 2003
Air Enforcement and Compliance Data	AIRS Facility Subsystem (AFS)	Q3 2004
RCRA Biennial Report	Biennial Reporting System (BRS)	Q3 2004

* EPA does not require States to submit these data.
** EPA is expecting to publish these in its 2002-2003 schedule of priority Type 1 Flows

Operating and Supporting the Network Registry/Repository. The Network Registry/Repository is a website that serves as the official record and location for the Network's Templates. The Registry/Repository will also store other Network documents such as TPAs. Trading Partners will depend upon the Registry/Repository to access the Templates to validate Flows they receive, and to properly structure Flows they are sending. Although a prototype Registry/Repository is already operational, further Registry/Repository development is needed to ensure smooth Network implementation.

Establishing Network Nodes. Network Nodes (see definition in Highlight 2) are the entry point for participants to the Network. Each Network Partner will be responsible for establishing its own Node. The pilot Node implementations provide sound starting points for Version 1 Network Nodes, but continued Node "how to" development guidelines are needed to ensure successful Network implementation.

Refining the Details of the End-to-end Information Exchange Process. The Network's technical information exchange process consists of several connected technical interactions that continue to be clarified, especially as Network technologies rapidly evolve. A party, perhaps the Board, should be identified to clarify what the technical details of the exchange process should be and to develop corresponding guidelines.

> **Highlight 2: Definition of a Network Node**
> A Network Node is a simple environmental information web service that initiates requests for information, processes authorized queries, and sends/receives the requested information in the standard format: XML (eXtensible Markup Language).

Connecting the Network to Existing Information Systems. Each Network Partner will have at least one existing information system from which they will draw data to send across the Network, and to which

they will store data received across the Network. Some data received across the Network will not have to be connected to existing systems as it may be used for a specific purpose that does not necessitate doing so.

Monitoring and Developing Recommendations on Network Technologies. The Network is based on the use of rapidly-evolving Internet-based technologies called web services (see Highlight 6). Although several outside entities track and develop recommendations and standards for these technologies, it is important that Network implementation include a general effort to track the development of these technologies and create corresponding recommendations for Network-specific adoptions and guidelines for these technologies.

Bringing the Pieces Together: Continuation of Network Implementation Projects. The Network Node Pilot Project – Beta Phase (Beta Phase) not only resulted in an improved understanding of how to implement Nodes, but also a "test" of most of the Network's organizational and technical frameworks. However, the limited scope of the Beta Phase did not allow for testing all Network components, and as such at least one subsequent effort (beginning in the first quarter of 2002) is needed to develop Version Network Node "how to" guidelines and thereby ensure smooth Network implementation. Additional pilot "bringing the pieces together" efforts over the next few years are also likely to help implementation.

Summary of Network Implementation Milestones

The Plan's milestones are high-level – the parties responsible for them will determine the specific details of how to achieve them. Both the milestones themselves and the enclosed milestones schedule may need to be adjusted, but adjustments should be made with the understanding that many milestones are inter-dependent. However, if the responsible parties accomplish the Plan's milestones within the timeframes outlined herein, the IMWG will meet its goal of implementing the Network by 2004. As shown in Figure 1, the Board is responsible for a majority of the Plan's milestones, and responsibility for the remaining milestones is split between EPA, other Network Partners, and the EDSC.

Figure 1: Network Implementation Plan Milestones: High-level Summary by Responsible Party, Milestone Type, and Time Period

Chapter 1: Introduction to the Network and the Network Implementation Plan

This Introduction provides an overview of the Implementation Plan (Plan) and the National Environmental Information Exchange Network (Network).

a.   Plan Objectives

This Plan has the following objectives:

- ❏   Enable the IMWG to establish, provide direction to, and outline specific responsibilities for a Network Steering Board (Board).

- ❏   Outline the major activities (e.g., establishing Network Flows) needed to implement the Network's organizational and technical frameworks.

- ❏   Identify critical path milestones for each major activity. For each milestone, include the (likely) responsible party/parties and an approximate timeline.

The Plan also summarizes the work on Network Implementation to date.

While this Plan contains a high-level description of the Board, a more detailed plan for establishing the Board is contained in the Board's Charter (see Appendix B).

b.   Plan Audience

This Plan is intended for one primary audience: current or future Network Partners. However, within this broad audience, the Plan is geared for both decision-makers and information system managers. The Plan's Executive Summary and the section Overviews are intended for decision makers, while the more detailed text is geared for the information system managers. The milestones at the end of each section and summarized at the end of the document are likely to be of interest to both decision makers and system managers.

c.   Plan Organization

The Plan is organized into three major sections: *Network Organizational Framework* (Chapter 2), *Network Technical Framework* (Chapter 3), and *Summary of Network Implementation Milestones* (Chapter 4).

d.   Network Background

The Network is an innovative approach for the exchange of environmental data among EPA, States, and other Partners. The States and EPA (both Headquarters and Regional Offices) have participated extensively in a variety of working groups and pilot projects over the past three years, setting in place the foundation for implementing the Network. This work was done primarily under the auspices of the IMWG. The IMWG was chartered in 1998 to address information management issues of concern to States and EPA. States and EPA created a partnership to foster the exchange of data and developed a "Vision and Operating Principles." The IMWG formed the EDSC to develop and promote the use of data standards

with EPA, States, Tribes, and other Network Partners. The IMWG also created the following Action Teams: the INSG, the Central Data Exchange (CDX) Action Team, the Facility Data Action Team (FDAT), the Permit Compliance System (PCS) / Interim Data Exchange Format (IDEF) Action Team, the Knowledge Transfer Action Team, and the Information Products Bulletin Action Team. The IMWG and its Action Teams developed the conceptual foundation and technical infrastructure of the Network. The IMWG established the principles of the Network in the *Blueprint for a National Environmental Information Exchange Network (Blueprint)*. The INSG has directed implementation efforts since then, preparation of this Implementation Plan discharges the final responsibilities of that team. (Updated information and background documents on the IMWG, its Action Teams and subgroups, and their activities are available on the IMWG's website at http://www.epa.gov/oei/imwg.)

e.   Network Vision

The Network Vision is long-term. Ultimately, the Network will improve the practice of environmental management by improving the flows of environmental data. Once fully operational, the Network will provide Partners with a secure environmental data "dial tone." Like the telephone, the Network will be reliable and powerful, yet transparent to its users. This new approach for exchanging environmental information is based on agreements, open standards, and common tools. The Network will enhance access to quality environmental data, reduce reporting burden, and make the data exchanges between EPA, States, and other Network Partners efficient and timely. Finally and most importantly, the Network will enable Partners to harness the power of the information revolution to address the environmental challenges of the future.

As outlined throughout this Plan, the Network is also a short-term vision for specific new collaborative efforts to build and use common tools for flowing data and thereby ultimately achieving the long-term vision.

f.   Network Overview

The Network will consist of both technical and organizational frameworks. The organizational framework consists of the decision-making and operational structures for building, maintaining, using, and evolving the Network. The technical framework encompasses the hardware, software, and protocols, and related technical decisions needed for Network implementation. (Chapters 2 and 3 explain both the framework's primary components and implementation needs.)

The Network uses the Internet and Internet-based protocols to streamline and standardize the information exchange process. The Network consists of Nodes that support the exchange of data among Network Partners. The data exchange on these Nodes will be formatted according to agreed upon, standardized Templates that rely on common, Internet-based protocols. The Templates depend on data standards that represent documented agreements on quality, consistency, formats, and definitions of commonly shared data. The suite of Templates will be compiled and tracked in the Network Registry/Repository.

The data exchanges among Network Partners are also governed by Trading Partner Agreements (TPAs). TPAs specify the appropriate Templates and explicitly define the quality, timeliness, and format of the data.

Throughout the Plan, participants in the Network are referred to as "Network Partners" or "Partners." Network Partners are the parties that officially participate in the Network. During the early Network implementation phase, "Network Partners" will include EPA, States, Tribes, and Territories. In the future, the term "Network Partners" is likely to include other governmental and possibly non-governmental parties.

g.   Network Rationale

The Network is designed as a strategic, collaborative approach to addressing the following powerful trends in environmental information management:

- ❑ As the scale and complexity of environmental challenges (and their associated data) grow, environmental managers must collect, assess, and securely exchange more data.

- ❑ The devolution of environmental management from the Federal to the State and local levels, and the attempts to use more "integrative" or "adaptive" management approaches, has dramatically broadened the universe of data and data exchange.

- ❑ Integrated environmental management requires integrated environmental information and nearly always requires information integrated *across* media, program areas, and geographic, political, and organizational boundaries.

Table 2: Network Requirements and Corresponding Components

Underlying Requirements for Broad Data Exchange	Network Component
❑ The Internet and its associated technologies are transforming information management approaches. They are also increasing public expectations for data access and presenting information security issues of a new magnitude.	

On an individual basis, Partners are responding to these trends by making major investments in their internal (often integrated) systems. As part of these investments, States have been supplementing (or in many cases eliminating) their use of EPA national systems. EPA is in the process of developing its first Agency-wide architecture. While these individual Partner efforts are important, there is no clear vision or framework for how Partners' systems will interoperate either locally or in the context of broader collaborations. These collaborations and the data flows which support them are essential to meeting current and future environmental challenges.

Experience suggests that managing these interchanges on a system-by-system, Program-by-Program basis will not scale to meet the identified information needs. Without a common framework, it is likely that individual Partners will build better and faster, but incompatible systems, and a tremendous opportunity will have been lost.

The Network is such a framework. It seizes the opportunity to provide a vision of how these systems will work together.

However, just saying the Network provides this framework is not enough. The Network must *demonstrate* that it fulfills a set of core technical requirements (see Table 2) while providing a cost-effective, technically-sound, and organizationally feasible approach to achieving efficient data exchange.   In addition, the transition from using the existing exchange methods to using the Network must be as seamless as possible. The sections below document how the Network will achieve these goals.

A common language in which to express and evaluate environmental information. This language must allow for multiple uses of data, especially its aggregation, integration, and an assessment of its quality.	Data standards and Templates
A common way to securely and easily provide robust access (locally, inter-governmentally, or publicly) to this information.	Nodes which act as simple web services

A common way to establish and document the commitments and obligations about data that Partners have with each other.	Trading Partner Agreements
A common technical infrastructure that leverages the revolutionary developments of the web and supports these functions but does not constrain Partners in their internal operations.	Standard Internet-based technologies

Three arguments support the Network approach's viability:

1. The Network is based upon industry open standards and tools.

2. The Network has been reviewed, critiqued, and generally praised by multiple private sector experts as a rational adaptation of these industry practices, and an effective way to leverage these new technologies at a rapid pace and at an acceptable level of risk.

3. These observations have been borne out in the early pilot implementations.

The establishment of a few Network Flows by the end of 2002 should provide the final validation for the Network's overall framework.

Establishing the formal cost-effectiveness of the Network will also depend upon the cost and performance data associated with Network Flows. Even before these Flows are in production, it is possible to estimate the costs of the Network. However, before outlining these costs, it is critical to clarify two points. First, the collection, management, and use of quality data are expensive and no technology is a panacea for these investments. The data and program integration required to address the broader environmental management trends will be expensive no matter what approach is used. Second, the costs of *any* strategic approach will be dominated by these data and management investments, not in the tools for sharing data. Although the Network will require significant new joint and individual participant investments, these investments will always be only a small percentage of total resources Network Partners are investing in information overall.

For example, State agencies typically invest anywhere from $0.5 to $2.0 million for information systems to support each major program area. These costs do not include the ongoing expenses of data collection and quality assurance. States' electronic reporting and e-government portal sites require similar investments. Early experience with the Network approach, on the other hand, suggests that most States will develop first generation Network Nodes for 5-10 percent (or less) of this amount for the Node itself (a one-time cost) and for each major Flow it adds to its Network exchanges, they will realize an increasing scale of cost efficiency. If this small investment in the Network produces even an incremental improvement in efficiency (for example, by reducing exchange costs and the costs of modernizing existing systems), it will provide a positive return.

The costs and risks of *not* developing the Network must also be considered. Without it, proliferation of proprietary systems that do not communicate with each other will continue to limit the ability to quickly integrate environmental data, whether in times of emergency or normal environmental management situations. The inability to develop agreements on simple data exchange mechanisms will mean that decision makers will continue to be limited in their access to quality, integrated environmental information.

h.   Network Development Strategies

Network development involves the coordinated activities of many EPA and Partner staff to define and use common standards and procedures. Recognizing that technology is in a rapid state of flux and that

change is constant, the INSG has developed the following set of operating strategies to guide Network implementation.

❑ **Learn by doing**. Some of the technologies and approaches are new. Network Partners must work together to learn how to apply the technologies to environmental data systems.

❑ **Demonstrate success**. The Network will grow only by demonstrating that it can meet the business needs of its users and their customers. Early activities will balance the development of long-term infrastructure with projects that use the Network to exchange data now.

❑ **Act incrementally**. Because the Network depends on coordinated efforts at many levels (policy, management, and technical), it will be implemented incrementally but along parallel, simultaneous tracks. Partners will be responsible for coordinating these investments within their organizations; the Board will coordinate between organizations.

❑ **Be flexible**. The Network will provide a simple set of common data services to its users, but it must be fundamentally based upon open, universal standards that Network Partners will have as much flexibility in implementing as possible.

❑ **Commit to change**. As stated in the *Blueprint*, "The core of the Network, however, is not technology; it is a commitment to change the way data are exchanged."

Network development will move quickly and purposefully. This Plan proposes that Network Flows and technical and organizational frameworks be developed and coordinated simultaneously. Flowing data will test and inform framework parameters, and development of the frameworks will enable more Flows to be conducted quickly. This approach is already in action. The Network Node Pilot Project – Alpha and Beta Phases has demonstrated the need and productivity of "hands on" collaboration between States and EPA in developing Flows. A report describing this project and lessons learned will be available during the first quarter of 2002.

i.   Key Network Components

As described, the Network consists of technical and organizational frameworks. The components that comprise these frameworks were originally described and diagramed in the *Blueprint* as a series of interlocking hexagons. This representation has evolved in subsequent discussions; Table 3 outlines the current understanding of the Network's components. Some of these components represent services that will support all Network Partners, while others, marked below, are specific to individual Network Partners.

Table 3: Network Components: Technical and Organizational Frameworks		
Technical Framework Components		**Organizational Framework Components**
Network security		IMWG
Data standards		The Board
Templates		The EDSC and its subteams
The Network Registry/Repository		Network-specific Action Teams
Network Nodes		Network Flows
The end-to-end information exchange process	Inform and relate to each other	TPAS
Connections between the Network and existing information systems		Internal organizational policies
(Other) Network technologies		Resource investments
Network pilot projects		

j.   Network Current Status

As detailed in the following documents[1], States and EPA have interacted extensively to build a foundation for the Network:

- ❑ *Shared Expectations for a National Environmental Information Exchange Network* (1998)
- ❑ *Blueprint for a National Environmental Information Exchange Network* (2000, amended in 2001)
- ❑ *Network Information Package* (2001)
- ❑ *Network Nodes: A Primer* (2001) (2002 version pending)

Table 4 provides an overview of the current status and accomplishments of Network components, in the

Table 4: Current Status of the Network Components

Implementation Area	Status as of early 2002
Network Organizational Framework	

order they are addressed in the Plan. All of the names and terms used in this section are described in detail in their respective sections.

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[1] With the exception of the Network Node Primer, these documents are available at http://www.epa.gov/oei/imwg. The Primer will be made available on a website soon.

Guiding Network Implementation and Participation	The INSG created the foundation for the Board and drafted the Network Implementation Plan. The INSG will sunset when the IMWG adopts the INSG's proposal for Network implementation, steering, and administration.
Developing and Managing Network Flows	Flows have been tested for the National Emission Inventory (Office of Air and Radiation), Permit Compliance System/Interim Data Exchange Format (IDEF) (also known as Central Data Exchange/IDEF), and the Federal Registry System.
Defining the Framework for Data Exchanges: TPAs	The States of Nebraska and Mississippi have signed TPAs for exchanging facility data and the INSG has developed a framework for creating TPA guidelines.
Defining the Responsibilities of Network Partners	States and EPA continue to devote significant staff and contractor time to supporting joint Network activities and build their technical and organizational infrastructures.

Network Technical Framework

Identifying Network Resources	Current resources include EPA and State staff time, contractor time, and investments technical infrastructure. In 2002, the U.S. Congress-sponsored Network Grant Program will distribute $25 million to eligible States, Tribes, and Territories. $1.5 million will be set aside for the Board in support of Network activities.
Ensuring Network Security	The *Blueprint* established four Network security levels. The Network Node Pilot Project -- Beta Phase successfully implemented three of the four levels.
Refining the Details of the End-to-End Information Exchange Process	The Beta Phase participants piloted the first end-to-end information exchanges for the Network in 2001. However, the best approach to a few steps in the exchange process has yet to be determined.
Connecting the Network to Existing Information Systems	In 2001, nearly all assessed States had one or more system that could be connected to the Network. As of early 2002, five Beta Phase States have connected their Nodes to their existing information systems.
Developing Data Exchange Templates	Templates have been drafted under IMWG Action Teams for permit compliance standards, air emissions, facility identification information, and ambient water quality monitoring.
Implementing Data Standards	The EDSC has finalized standards for industry classification, chemical, biological taxonomy, calendar date, facility identification, and latitude/longitude. Standards for enforcement/compliance, Tribal identifiers, water quality monitoring, and permitting data are close to completion.
Operating and Supporting the Network Registry/Repository	The test Network Registry/Repository is operational and is temporarily being operated by the National Institute of Standards and Technology. The Beta Phase successfully tested and used this test Registry/Repository.
Establishing Network Nodes	Six Beta Phase States and CDX (EPA) have established and tested pilot Nodes.
Developing Recommendations on Network Technologies	External review of the *Blueprint* by technical experts has produced positive feedback on Network Technologies. Some areas for further clarification have been identified through the Beta Phase.

Introduction

Bringing the Pieces Together: Continuation of Network Implementation Projects	The Beta Phase is preparing recommendations for the next pilot activities, which will most likely be executed under the IMWG and coordinated with the EDSC and the Board.

Chapter 2: Network Organizational Framework

Chapter 2: Network Organizational Framework

a.   Overview

This Chapter defines several key areas of organizational development and support required for Network implementation. The Network, as envisioned in the *Blueprint* and in this Plan, will require the individual and collective efforts of many organizations and their staff. The exact combination of formal policies necessary to support the Network (both at the collective and at the individual Partner level) are still being developed. Given that Network Partners have been exchanging electronic data for over 25 years, a significant amount of Network-related institutions exist. In some cases, the Network will adapt to and supplement these existing institutions, whereas in other cases, the Network will require the creation of new institutions.

This Chapter describes the existing and, in some cases, yet-to-be-formed institutions and services that will: support all Network Partners, manage Network Flows, guide the agreements that will be made between Network Partners, support the capacity of Partners to participate in the Network, and enable Network implementation with resource investments.

This chapter is organized into the following sections:

- ❑ *Guiding Network Implementation and Participation*, which describes the following organizations and their relationship to the Network:
  - ▪ The IMWG
  - ▪ The Board
  - ▪ EDSC (and its Data Standards Teams) and Network-specific Action Teams
- ❑ *Defining Mutual Expectations for Specific Data Exchanges*: *TPAs*
- ❑ *Defining the Responsibilities of Network Partners*
- ❑ *Identifying Network Resources*

Network Partners' internal policies are outside of the Network's scope and governance. Most Network Partners will need to develop new/supplemental internal policies to fulfill their Network-related exchange responsibilities. To support Partners' internal policy needs, the Board *will* provide guidelines on topics such as TPAs and Node establishment.

b.   Guiding Network Implementation and Participation

Overview

Since late 2000, when the IMWG released the *Blueprint*, joint State/EPA groups have been developing the organizational infrastructure needed for Network implementation. This section briefly describes the institutions that will hold primary responsibility for Network implementation: the IMWG, Board, EDSC (and its Teams), and IMWG Action Teams.

Some of the institutions that will guide the Network will have formal reporting relationships to the IMWG, while others will merely coordinate with each other.

Figure 2 illustrates the relationship between several Network institutions.

Figure 2: Institutional Relationships of the Network

IMWG

(The *Introduction* provides background on the IMWG.) All of the IMWG's Action Teams are collaborative efforts with State, EPA, and, in the case of the EDSC, Tribal representatives. The Board will report to the IMWG on Network progress and will forward the policy decisions that are outside of its scope to the IMWG.

Network Steering Board (Board)

As discussed, the Board is the major new institution to be created through the adoption of this Plan. The IMWG chartered the INSG, a temporary group, to develop this Plan and a proposal for a more permanent "home" for Network steering and administration (i.e., the Board). The Board will assume responsibility for the INSG's current functions and subgroups as well as the new functions documented in its Charter (see Appendix B: NSB Charter) and this Plan.

Highlight 3: High-Level Board Function Areas

- Network Registry and Repository

- Network Specifications, Guideline, and Best Practices

- Technical Assistance to Network Partners

- Communication/Outreach

- Network Steering and Oversight

To ensure a continuity of service and demonstrate the importance of the Board's work, the IMWG Co-chairs will be the Board's first Co-chairs.[2] A small group of State and EPA representatives will comprise the Board's initial membership, but Board membership will expand along with the Network.

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[2] The Board's first Co-Chairs will be Kim Nelson, the Assistant Administrator for EPA's Office of Environmental Information, and Dana Bisbee, the Commissioner (nominated) of the New Hampshire Department of Environmental Services.

Chapter 2: Network Organizational Framework

The Board's mission will be to steer the cumulative efforts of Network Partners towards success and to ensure that the Network's administration is effective, impartial, and responsive to all Network Partners. The Board will have full-time staff to perform administrative functions and will develop timelines for its activities.

In its initial stages, the Board will meet a majority of its responsibilities by holding plenary sessions and sponsoring work teams, such as the Technical Resource Group (TRG), as deemed necessary. Until new Teams are created, the TRG has been assigned tasks to support the Board's functions. Designated Board staff will support these sessions, the work of the TRG, and other Board work teams. This configuration was developed after extensive deliberations of the INSG, including the assessment of many related inter-governmental exchange efforts. INSG members anticipate that as the Network expands, and as many Network administration services become available from other (vendor and inter-governmental) sources, that the Board's structure, and function will also change.

Additional information about the specific services and guidelines expected from the Board is provided below.

IMWG Action Teams and the EDSC

The Board will build upon the work of the EDSC, the EDSC Data Standards Teams, and Network-specific Action Teams. In 2002, the Board will create joint policies with the EDSC through a cooperative agreement. The EDSC will continue its work on data standards, which are described further in the Chapter 3. (See also http://www.epa.gov/edsc for more information on the EDSC.)

Network Steering Board Services

Although many IMWG Action Teams will contribute to Network implementation, the Board is the primary institution that will focus on the Network itself. The Board will provide a number of services to guide and support Network Partners' participation in the Network. For example, the Board will provide potential Network Partners with information on Templates, Node "How Tos," and TPAs.

The Board will also develop Network policies for areas that require joint decisions regarding Network operation. As Network participation is strictly voluntary, Board-developed guidelines will be *recommendations*.
Building the capacity of Network Partners to participate in the Network

To help build the capacity of Network Partners to participate in the Network, the Board will provide assistance in several forms, including meeting, workshops and trainings, and information posted on the Network website. Although some of the assistance will tap outside expertise (especially in specialized technical areas), many of these activities will include peer-to-peer learning between Network Partners. The Board will coordinate its Network assistance program with the broader information assistance activities of the IMWG.

The private and public sector exchange networks studied during the development of the *Blueprint* and this Plan typically had some form of program to provide technical and other assistance to Network Partners. The assistance programs often included a "readiness assessment" that individual Network Partners can use to plan their Network implementation activities. In aggregate, this information about how "ready" Network Partners are to participate in the Network can be used to provide targeted assistance.

After conducting the Self Assessment of State Network Readiness in 2001, the INSG identified three areas for targeted assistance activities: Use of XML and related technologies, selection and implementation of Node middleware, and Node management and organizational (e.g., business process linkages between the Node and program offices). In addition to providing support in these and other areas, the Board will conduct a follow-up Readiness Assessment in 2002.

Chapter 2: Network Organizational Framework

Development of Guidelines and Best Practices

The Board will also provide Network assistance through the development of materials on Network technical best practices and lessons learned. Early outreach and assistance to Network Partners will not only accelerate Partner's implementation efforts, but also make an important "first impression" about the benefits offered by Network technologies.

Milestones

Many of the milestones that will be the responsibility of the IMWG, the Board, the EDSC, and Action Teams are either technical in nature and are therefore described under the Network Technical Framework (Chapter 3), or are covered later in this Chapter.

Table 5: Guiding Network Implementation and Participation: Milestones

Responsible Party	Milestone	Start Year	Start Quarter	End Year	End Quarter
Board	Develop an assistance strategy and staffing/organization plan	2002	Q1	2002	Q3
Board	Re-charter, fund, and staff Joint Technical Resource Group	2002	Q1	2002	Q1
Board	Provide Updated State Network Readiness Self-Assessment	2002	Q2	2002	Q4
Board	Establish system to assess Network costs and performance measures	2002	Q3	2003	Q1
Board	Provide Updated Readiness Assessments for Territories, Tribes and other Network partners	2003	Q2	2003	Q4
Board	Designate full-time staff to support the Network Steering Board	underway		2002	Q1
Board	Launch the Network Website	underway		2002	Q4
Board	Develop 3 Technology Templates for State Nodes*	underway		2003	Q4
IMWG	Charter Network Steering Board	underway		2002	Q1

* This milestone also appears in *Establishing Network Nodes*

c.   Developing Network Flows

Overview

A Network Flow is defined as a routine use of the Network to satisfy a business need for exchanging specific information (and replace a legacy flow if one existed) between two or more Network Partners. Network Flows are defined by the exact data that will be exchanged in particular transactions rather than by the technical details of the exchange process, which are covered in *Refining the Details of the End-to-end Information Exchange Process* (in Chapter 3). For example, if an IMWG Action Team pilots the use of the Network for regular exchanges of ambient water quality monitoring data among States and EPA. This exchange is called the "Ambient Water Quality Flow." (Figure 3 depicts the typical steps in establishing a flow.)

Figure 3: Typical Steps in Establishing a Network Flow
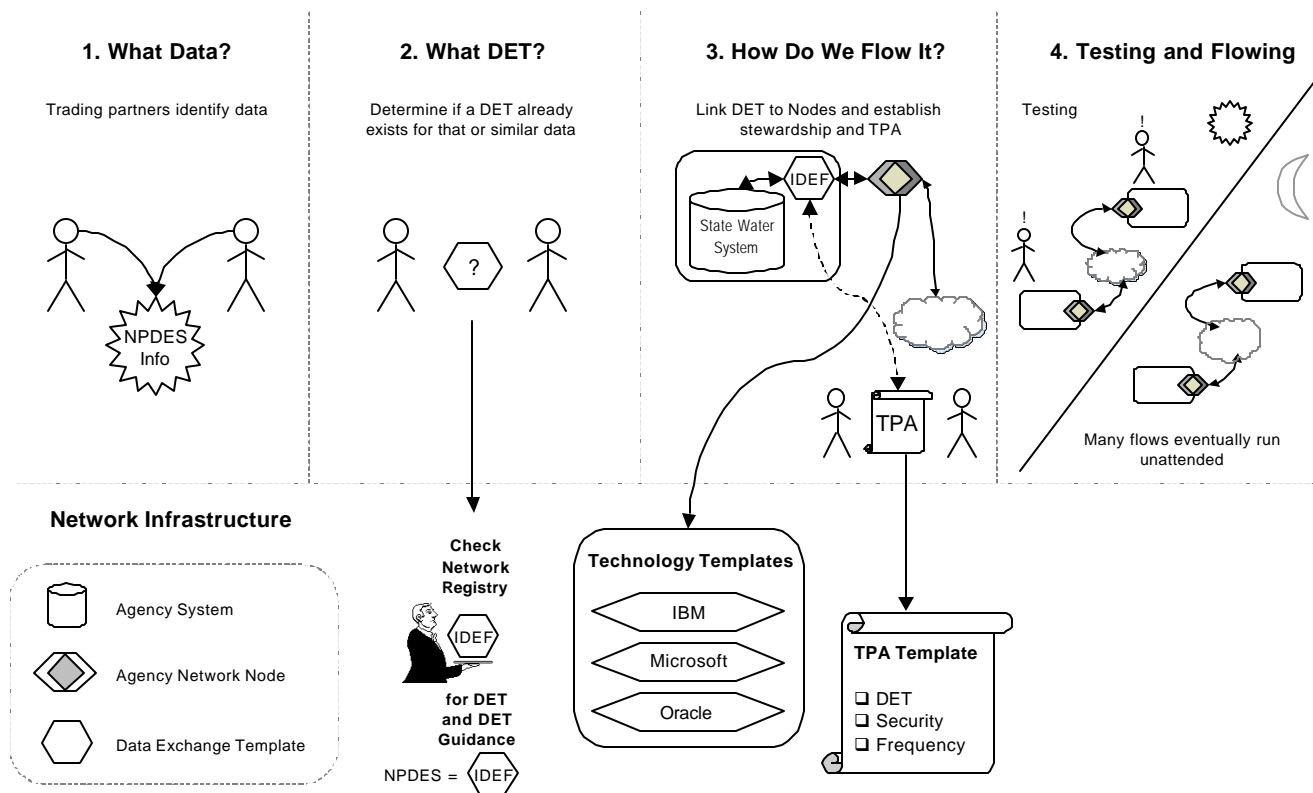
The Plan divides Network Flows into three proposed Flow types (described in more detail in Highlight 4). One particular type of data can be exchanged in different Flow types.[3] Type 1 Flows, which will replace existing flows from States to nine large EPA national systems, are a key part of this Plan.

Establishing Type 1 Flows

Type 1 Flows are the Flows primarily from States to EPA's national systems. These Flows are used to maintain the current EPA national systems, are often identified in statutes, and represent the current core business Flows of the original set of Network Partners.

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[3] The proposed Flow groupings are currently somewhat parochial and will become obsolete as Network Partners. For now, they help to communicate the Network's widespread applicability, and provide a temporary way of identifying Network Flows which will replace existing "official" legacy flows (Type 1)

Highlight 4: Proposed Flow Types

Note: These types will continue to be developed by the Board.)

Type 1 (State-EPA Regulatory) Flows: These Flows use the Network to replace existing regulatory flows into the following EPA national systems (see Table 6) through EPA's Central Data Exchange (CDX) Node. These flows usually occur to fulfill a regulatory obligation and must be implemented in accordance with a signed TPA. These flows are identified in a preliminary schedule for Type 1 Template development below.

Type 2 (Routine Bilateral) Flows: Flows, which use the Network for bilateral data exchanges between/among States and EPA (program or regional office), but whose data are not being sent to fill any of the nine identified national systems, fall into Type 2. Recipients of Type 2 Flows make a copy of the data for local storage and use (if they only display the data locally, it is a Type 3 Flow). These Flows may be funded and/or obligated in a grant or other agreement, in addition/substitution for a TPA.) Where these Flows involve EPA, the presumption is that they will go through CDX.

Type 3 (Ad Hoc/Interactive) Flows: These Flows are officially established by participants to serve ad hoc requests for information from their Nodes. Network Partners may use these Flows to "look up" data, or to integrate data "on-the-fly" with local or remote applications. These data exchanges do not fulfill any regulatory requirement and do not necessary involve an exchange with EPA (CDX). These exchanges will be covered by either a unilateral TPA (as described in the *Blueprint*) or a TPA between Network Partners.

This Plan recommends that, in the first quarter of 2002, EPA publish a schedule of when it will be ready to receive Type 1 Flows over the 2002-2003 timeframe. The IMWG will coordinate the collection of feedback from States on this proposal to identify opportunities to accelerate or re-phase it, to take advantage of investments or interest from a critical mass of States. EPA will then address its Network Flow schedule for Type 2 and Type 3 Flows, again soliciting feedback from Network Partners through the IMWG.

As discussed in the following section on Templates, this Plan recommends that EPA propose a schedule for the development of the Templates that will support Type 1 Flows (Table 6). The use of interim Templates will help to inform both subsequent Templates and Flow expectations. It is also likely that there will be a need for both flow phasing and dual data flows using both legacy format/paths and the Network while the CDX-to-national system linkage is constructed, and to aid in testing and diagnostics until the Flow goes into production.

This does not mean that all work on these Flows need be paced solely by this schedule. Some States may choose to invest in mapping their systems to the draft Template, and make their data available on their Nodes prior to when EPA has scheduled to receive this data. This could support testing of the Template, or of EPA's side of the linkage, and it also could be used to provide access to that data through a small application. States may seek to negotiate with EPA to accept this data in lieu of traditional flows, as long as provisions for getting this data properly into the national system can be made. Note that Partners that take this "early implementer" option may need to edit their data mapping once a finalized Template is implemented.

The following table maps the type of data that would be exchanged through the Network to replace existing regulatory flows to current EPA national systems. Templates will be created for each Flow.

Table 6: Draft Template Schedule for Type 1 Flows

Data/Business Area	System	Initial Target Date for Draft Template Development

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Air Emissions Estimates	National Emissions Inventory (NEI)**	Draft Template established
Water (NDPES) Permit, Enforcement, Compliance and Discharge Data	Permit Compliance System (PCS)**	Templates in testing now (including IDEF and eDMR)
Ambient Water Quality Monitoring Data	Water Quality Information System (STORET)**	Draft Template established
Facility Identification Data*	Facility Registry System**	Draft Template established
Public Water Supply Testing and Violation Data	Safe Drinking Water Information System (SDWIS)	Q1 2003
Resource Conservation and Recovery Act Data	RCRA Information System (RCRIS) RCRAInfo**	Site ID Form under development
Air Quality Monitoring Data	Aerometric Information Retrieval Air Quality Subsystem (AIRS AQS)**	Q1 2003
Air Enforcement and Compliance Data	AIRS Facility Subsystem (AFS)	Q3 2004
RCRA Biennial Report	Biennial Reporting System (BRS)	Q3 2004

* EPA does not require States to submit these data.
** EPA is expecting to publish these in its 2002-2003 schedule of priority Type 1 Flows

Establishing Type 2 and Type 3 Flows

This Plan supports the opportunistic, yet coordinated, development of Type 2 and Type 3 Network Flows. Most of these Flows will likely be between more localized groups (i.e., a region and its States), or Network Partners with some kind of programmatic linkage. They are likely to be pursued by Network Partners that:

❑ Have a regular need to send or receive data with Network Partners.

❑ Have different data formats than those of the Network Partners.

❑ Would like to use the data for multiple purposes (e.g., into multiple States' back-end systems, regional clearinghouses, and to a public website).

❑ Would like to validate data and data structure exchanged with Network Partners through the use of Templates.

❑ Would like to exchange data (i.e., request it and provide it) on a "come and get it" or "as needed" basis, as well as a "push" or "here it is" basis.

Milestones

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Table 7: Developing Network Flows: Milestones

Responsible Party	Milestone	Start Year	Start Quarter	End Year	End Quarter
EPA	Accept facility data from Beta Phase (State) Participants through EPA's Node	2002	Q2	2002	Q2
EPA	Publish Schedule for Type 1 Flows for 2002-2003*	underway		2002	Q1
EPA/Board	Further define and clarify Flow types*	2002	Q1	2002	Q1

* Also appears in *Defining the Responsibilities of Network Partners*

d.   Defining Mutual Expectations for Specific Data Exchanges: Trading Partner Agreements (TPAs)

Overview

A TPA is, or can be defined as, a stand-alone document, an addendum or supplement to an existing agreement, or part of an existing agreement. If existing agreements and their amendments satisfy the minimum set of elements that document the content and process of a Flow, then a separate, stand-alone document is not required. For the purposes of this Plan, all such agreements are called TPAs.

A TPA defines the Network Partners, information, stewardship, security, and other relevant technical and organizational details essential for mutually-agreed upon exchange of information between two or more Network Partners.

Individual Network Partners will be responsible for learning about TPAs, using the TPA guidelines and templates, and negotiating TPAs amongst themselves. The Board will create TPA guidelines for a common reference point for questions about TPA creation and general content. The TPA guidelines is envisioned to be a dynamic resource for Network Partners that will evolve with ongoing TPA creation, Network Flows, and other Network activities. The TPA guidelines are only intended to be a model; Network Partners will modify TPAs to meet their mutual needs. (See Appendix A: Framework for TPA Guidelines, FAQs and Checklists)

TPAs are envisioned to be the authoritative documents setting agreements about Network Data exchanges between Network Partners. The Board will not become involved in resolution of bilateral disputes over data exchange or agreement terms between parties. TPAs may document new mutual obligations between Partners, but cannot be used to establish new authority of one Partner over another.

Network Partners will need to develop at least a basic internal strategy for managing multiple TPAs across programs and with various offices and agencies. The strategy should address priorities for Network Flows to be documented in TPAs, resource and staffing issues and implications for current business and management processes associated with data exchange. Because EPA will soon be developing and managing many TPAs, this plan identifies a milestone for EPA to develop TPA policies or guidelines as needed.

Milestones

Table 8: Trading Partner Agreements: Milestones

Responsible Party	Milestone	Start Year	Start Quarter	End Year	End Quarter
Board	Publish Trading Partner Agreement Guidelines and checklists (Version 1.0)	2002	Q2	2002	Q4
Board	Publish Trading Partner Agreement Guidelines (Version 2.0)	2004	Q3	2004	Q4
EPA	Develop initial internal Guidelines on roles, responsibilities, and support for Trading Partner Agreement development	2002	Q2	2002	Q3
EPA	Establish 10 additional Trading Partner Agreements with State partners	underway		2003	Q4
EPA	Establish 5 Trading Partner Agreements with State partners	underway		2002	Q3
EPA	Establish additional Trading Partner Agreements for a total of 8 Network Flows to National Systems	underway		2004	Q4
EPA	Establish Trading Partner Agreements for 3 Network Flows to National Systems	underway		2002	Q4

e. Defining the Responsibilities of Network Partners

Overview

Network Partners are expected to use the Network and contribute to its institutions. Most of the investments, work, commitments, and policies needed to implement the Network will be performed within individual agencies as they use the Network. The organizational and policy infrastructure needed to engage the Network will be a small, but important part of a Partner's overall information management infrastructure. Network Partners will determine their internal organization, their connection to the Network, and their level of in-kind contributions to Network administration. Network Partners are not required to report to any of the previously mentioned institutions, however, they, are expected to participate in the work of these institutions to the highest extent practicable. This participation is crucial not only to execute needed work, but also to keep the Network connected to the needs of its members.

All Network Partners will be undertaking re-engineering or re-organization efforts while they engage the Network. State environmental agencies will continue to implement and re-engineer systems, invest in their own organizational structures, and develop information management policies. These activities will increase their technical ability to use the Network. EPA, as a unique Network Partner, is preparing its systems (both technical and organizational) to accommodate Network data exchange. EPA's Office of Environmental Information (particularly Central Data Exchange) is working with other EPA Offices and specific Programs to strengthen its ability to participate in the Network. In parallel with its Network-specific efforts, EPA is developing an agency-wide Enterprise Architecture, a system of enterprise repositories, and an information systems' integration strategy. The Board, like the Partners, will simultaneously be shaping its projects and experiencing a similar "learning curve."

Milestones

Chapter 2: Network Organizational Framework

Table 9: Defining the Responsibilities of Network Partners: Milestones

Responsible Party	Milestone	Start Year	Start Quarter	End Year	End Quarter
Board	Establish statement of principles for Network Partner responsibilities	2002	Q2	2002	Q4
EPA	Publish list of Type 1 Network Flows for 2003 -2004	underway		2002	Q3

f.   Identifying Network Resources

Overview

Establishing the Network requires a combination of financial and human resources. During 2000-2001, EPA and States devoted significant staff and contractor time to various Network teams and workgroups. These investments directly and powerfully demonstrate that Network participants expect the Network to realize a positive return on their investments, both to their own organizations and to the national efforts for improved environmental management.

EPA and States plan to continue investing in the Network through internal EPA investments in Network development (including the support of EPA contractors), EPA support to other Network Partners (States, Territories, and Tribes) for joint Network development and Network participation, and independent State investments.   Other government agencies or outside parties may also directly or indirectly support Network development, but these potential external investments are uncertain at present. In addition, this Plan includes many milestones such as the development of CDX that, when met, will help to ensure that the needed Network infrastructure and guidelines are available as the Grant funds are allocated.

Internal EPA Resource Investments

In 2002, EPA will continue to provide direct and in-kind support for its development and use of the Network through continuing development of its Node at Central Data Exchange, working on linking the EPA Node to EPA national systems, preparing to accept Network Flows to these systems, supporting the establishment of Nodes at EPA Regions, participating in numerous Network teams and workgroups, and providing for Network Administration. Over the next three to five years, EPA has pledged to continue to provide this support, as described below.

Network Grant Program

In 2002, the U.S. Congress will provide $25 million in grant funds for a National Environmental Information Exchange Network Grant Program (Network Grant Program) that will provide resources to States, Territories, and Tribes for Network implementation. EPA has designated $1.5 million of these funds to support Network Administration services for Network Partners. Additionally, working groups

staffed by EPA, States, and Territories will conduct a significant portion of the Network administration. EPA is reserving $2.5 million of these funds to support Tribes' Network participation.[4] This section will be completed when the Network Grant Guidance is released (during the second week of February 2002).

Other EPA Grants to States

Other EPA grants, such as Performance Partnership Grants that are not specifically targeted for Network development or participation, are very significant for many program areas even if the grant funds constitute a minority of State agency information-related expenditures. Many of these grants support program operations including data collection management and reporting to EPA national information systems. States and EPA Regions are looking at how to use these funds to shift and enhance their reporting to national information systems through use of the Network. These grant resources may become especially significant once the basic Network infrastructure is established and the Network becomes the standard approach for these exchanges.

States and Regions that have had or are working toward Performance Partnership Grants may use the greater flexibility provided by this approach to accelerate Network implementation in priority areas. The State of Maryland and EPA Region III, for example, implemented this approach in their Performance Partnership Grant. EPA is continuing its internal discussion on developing guidelines in this area to ensure that the broadest possible resources are available to accelerate Network implementation.

State Agency Resource Investments[5]

A key goal of this Plan is to make the Network an attractive option for State data interchange needs.

Collectively, State environmental agencies spend at least $200-300M per year on information. Past and current Network implementation activities have been supported by direct investments of State staff and resources in early workgroups and pilots. As the Network grows, both these direct contributions and the leveraging of the larger programmatic and enterprise investments will become increasingly important. Several State agencies are already building Network investments into their operating budgets. As States continue to make internal investments, it is likely that data exchange (both public and inter-governmental) will continue to grow in importance. As such, State budget planners are a key audience of this document, especially as they assess how the Network will fit into their agencies' broader information strategies.

In addition, as the Network expands to include other State agencies (such as health and natural resources), it will be able to leverage their information investments as well. State environmental (and other) program managers will continue to make large investments in information.

Additional Resources and Support for the Network

Additional funding/partnering opportunities for the Network may be available from:

❑ Network Partners will be able to use existing grants for data management activities (especially where funds are provided specifically for data collection) to support Network participation.

❑ Partnerships with other Federal agencies with intensive data interchange needs; these include public health, natural resource, and commerce agencies.

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[4] As of this writing, the details of the how the funds for Tribes will be allocated are not known.
[5] These investments may also apply to other non-EPA Network Partners.

❑ Private foundations seeking to improve environmental protection, government partnerships, and related issues would likely be supportive of targeted Network support, especially where they support specific underserved constituencies.

❑ Private Sector Technology Market. The technology sector, both as an opportunity to showcase products and through their foundations, is likely to support the Network. By soliciting feedback from private sector experts, the INSG has already received useful critiques and extensions for the Network technical infrastructure. The absolute adherence to open, universal standards as the basis for the Network ensures that this support will not conflict with the public interest.

As appropriate, the Board will evaluate and pursue these sources where they might support joint infrastructure. Network Partners will also continue to pursue these and other sources to support Network efforts.

Chapter 2: Network Organizational Framework

Chapter 3: Network Technical Framework

a.   Overview

Flowing data over the Network to conduct business is the single most important objective and metric guiding Network implementation. The Network has been designed to use standard technologies that enable seamless exchanges of nearly any kind of data from one computer to another. The linchpin to the Network's ultimate success is the commitment of Partners to help develop, and then abide by, the conventions for how the tools are applied. Network Partners will have to collaborate closely to ensure that they build one (and only one) Network.

This section covers the implementation needs for several Network tools. The most important criterion for including these tools is that they each merit a concerted effort by a designated party. This section does not provide an introductory background on Network tools; rather, it discusses how Network tools need to be addressed for Network implementation.

Successful implementation of Network tools will depend upon Partners' collective ability to learn from and incorporate the benefits of early work. "Learning by doing" is already occurring and providing invaluable lessons; the Network Node Pilot Project – Beta Phase has implemented most of the Network tools, and in so doing, has informed future efforts to improve these tools. Flowing data will test and inform choices about infrastructure as it is built, and building infrastructure will enable more Flows to be conducted more quickly. This Plan rests upon coordinated and simultaneous efforts, such as developing guidelines on data standards and Templates. Early Network Partners are already beginning to use the current standards and the Templates. This strategy will require the management of the dependencies between these tools as they are applied. (Many of these linkages did not exist before.) For example, currently the format and transport of air data has nothing to do with the format and transport of water data. The Network is going to change this; air and water data will now share data standards (to support integration) and will flow over Partner Nodes.

Agreement to use XML and related technologies alone is insufficient.   Without agreements on its application, XML *can* be used to create high performance *proprietary* applications that are *not* interoperable. This is especially the case with Templates, which, without broader agreements, will simply "mimic" the proprietary architectures and thereby perpetuate the current data exchange problems.

For two reasons, this Plan includes an ambitious schedule for the implementation of the milestones associated with the Network's technical framework: first, to accelerate Network implementation, and second, to make the all-important "first impression" on Network Partners. This first impression will encourage Partners to begin implementing Network technologies using the common Network guidelines. Hopefully, Network Partners that have not yet begun developing Templates would make use of established Templates rather than starting from scratch.   The INSG expects this early window of opportunity to close within the next two years as XML becomes a common tool.

Implementation of Network tools will also require oversight, direction, and support of those responsible for the Network's "big picture." The Board will oversee the creation of a robust technical infrastructure, and help avoid the scenario where hundreds of dedicated State and EPA staff members independently move forward and re-create the current "hodgepodge" of intergovernmental systems.

Chapter 3: Network Technical Infrastructure

The following Network tools comprise the Network's technical framework and are covered in this Chapter:

Ensuring Network Security

Network security is complex and extremely important. This Plan does not attempt to resolve all security issues related to environmental data. Instead, the Network provides a generic framework of four security levels to secure Network Flows during the data exchange process. Network implementation will also require security of the Network technical infrastructure (i.e., Network Nodes and the Network Registry).

Implementing Data Standards

Data standards are the documented agreements on data formats and definitions of common data. Data standards are especially important tools for data integration and exchange because they allow data from many compliant sources to be integrated. The benefits of data standards are even greater for Network Partners because they reduce ambiguity of the information contained in Data Exchange Templates.

Developing Data Exchange Templates (Templates)

Templates describe and enforce the format and specific restrictions, where applicable, of the data being exchanged across the Network. Specifically, the Templates are likely to be either XML Document Type Definitions (DTDs) or XML Schema. Network implementation requires not only that Templates be developed and used, but that their development and coordination be harmonized to ensure compatibility across Network Flows. Templates will continue to be developed as new data standards arise and existing standards are improved.

Operating and Supporting the Network Registry / Repository

The Network Registry/Repository is a website that serves as the official record and location for the Network's Templates. The Registry/Repository will also store other Network documents such as TPAs. Trading Partners will depend upon the Registry to access the Templates to validate Flows they receive and properly structure Flows they are sending.

Establishing Network Nodes

Network Nodes are the entry points for Network Partners to the Network. Each Network Partner will be responsible for establishing its own Node.

Highlight 5: Definition of a Network Node

A Network node is a simple environmental information web service that initiates requests for information, processes authorized queries, and sends/receives the requested information in a standard format, XML (eXtensible Markup Language). A node validates this information against a predefined Schema/Data Exchange Template (Template).

Refining the End-to-end Information Exchange Process

The Network information exchange process begins when a Network Partner (or eventually an outside party) sends a valid request for information across the Network according to Network guidelines. The process ends when the requestor receives the requested information or a descriptive error message. (What Network Partners do with the information after receiving it is outlined in TPAs and is not part of the information *exchange* process.) In between the "begin" and "end" points of exchange are several connected technical processes that continue to be clarified.

Chapter 3: Network Technical Infrastructure

Connecting the Network and Existing Information Systems

Each Network Partner will have at least one existing information system from which they will draw data to send across the Network, and to which they will store data received across the Network. Connecting Nodes to these existing systems may be a time consuming process for many Network Partners.

Monitoring and Developing Recommendations on Network Technologies

The Network is based on the use of rapidly-evolving Internet-based technologies called web services (see Highlight 6). Although several outside entities track and develop recommendations and standards for these technologies, it is important that Network implementation include a general effort to track the development of these technologies and create corresponding recommendations for Network-specific adoptions and guidelines for these technologies.

Bringing the Pieces Together: Continuation of Network Pilot Implementation Projects

The Network Node Pilot Project – Beta Phase (Beta Phase) not only resulted in an improved understanding of how to implement Nodes, but also a "test" of most of the Network's policy and technical components. At a minimum, one additional pilot effort is needed.

> **Highlight 6: Definition of a Web Service**
>
> A *web service* is software that exposes very simple functionality of business applications through the Internet. Web services communicate with other web services via standards-based technologies that can be accessed by trading partners independent of hardware, operating system, or programming environment. *Nodes* are web services that provide environmental information to Partners

b.   Ensuring Network Security

Overview

Network security is extremely important and complex. The Network and this Plan do not attempt to resolve all security issues related to environmental data. Instead, the Network provides a generic framework of four security levels to be used by Partners to secure their Network Flows during the data exchange process. This framework also addresses the security of the Network technical infrastructure (i.e., Nodes and the Registry). Establishing the four security levels (even more than their functional specification) represents the most significant contribution of the Network to the security of environmental information exchanges between Network Partners. In so doing, the context of the discussion about security has evolved from a focus on individual systems to a focus on Partner agencies as enterprises.

Neither the Plan nor the Network addresses the broader policy issues of what data should be considered sensitive (and therefore require additional security) or what Network Partners will do with data once they receive it through the Network. However, TPAs may include specific information about how Trading Partners should and should not use the data they exchange, and how data security should be handled. The IMWG will work with Network Partners to address these bigger, policy-oriented security questions.

In 2002, the general areas of information security and access are expected to become a major area of IMWG activity. The Board and the IMWG will coordinate and connect the Network security efforts with the broader Federal and inter-governmental security deliberations. These will include coordination with the Federal Homeland Security Office (through EPA), the National Association of County Information Officers, and others.

Table 10 (below) identifies areas of the Network where security issues arise, the place in the Network where the security issue is addressed, and the party responsible for ensuring that the appropriate security measures have been taken.

Table 10: Network Security Areas

Network Security Area	Place in Network Where Area Addressed	Responsible Party/Tool
Data within Partner systems (before being exchanged)	None	Determined by Partner (may be governed by other agreements)
Exchange process requestor and responder*	Node	Network Security Levels outlined in the *Blueprint* (see Highlight 7)
Node security	Partner firewall and Node	Partner/ Node Specifications
Registry/Repository security	Registry firewall	Board, (Registry Operations Group)
Data after being exchanged across the Network	TPAs	Trading Partners/TPAs
Received data within Partner system	None	Determined by Partner (may be governed by other agreements)

   * For many transactions this type of security will not be needed.

The *Blueprint* outlines four escalating security levels for *the exchange of* Network Flows (see Highlight 7). These levels support the functions of a) identifying, when necessary, who is requesting and receiving information to ensure that the information comes from and is sent to appropriate parties only, and b) ensuring that the data are secure (encrypted, typically) during the exchange process. Note that some Flows will not require the higher levels of security, just as many public websites currently allow anyone to download information or forms. The technologies involved (firewalls, digital certificates) at each level represent a pragmatic application of existing technologies, most of which are in use by agencies today. External technical review has confirmed that these four proposed levels represent an appropriate starting point for Network implementation, but also that the Board should ensure that a designated party is responsible for further testing and refining of these levels.

Highlight 7: Network Security Levels Outlined in the *Blueprint*

The *Blueprint* established the following security levels:

Level 1: Public information, available to all users, without authentication. Data are protected from unauthorized changes by standard /node web firewall. No additional data integrity or confidentiality is provided.

Level 2: Information that requires the authentication of either the requestor or the source (but not both). This provides additional confidence that the requestor is talking to the official node, or that an official node is making the request. Implemented using Secure Socket Layer (SSL) with server certificates. SSL provides additional confidentiality (via encryption) and integrity checks.

Level 3: Information that requires bi-directional authentication (i.e., of the requestor and the source). Implemented using bi-directional SSL with source and requestor server certificates.

Level 4: Information requiring the highest level of non-repudiation as well as confidentiality and integrity checks. Implemented using level 2-3 with the addition of a digital signature of the data package. This level of security is anticipated only where a signature of a designated official is absolutely necessary for a transaction.

The Board will continue to revise these levels. Most exchanges will likely use Levels 2-3.

Chapter 3: Network Technical Infrastructure

Infrastructure security is handled by the same measures that protect websites from being "hacked," and as such, does not need to be developed separately for the Network. The security levels discussed above provide some protection for the Network's technical infrastructure – namely Nodes and the Network Registry, and firewalls provide most of the additional protection. As Nodes and the Registry begin to move beyond the pilot stage, the Board will need to systematically address security issues for these assets. The Board will do so through the technical work of the groups overseeing their respective guidelines and operations, including the group responsible for operating the Network Registry and the group responsible for developing Node functional specifications (once they are established by the Board). Given how important and pervasive security is to the Network, the Board may also establish a separate security advisory group.

This Plan specifies that the Board will develop security functional specifications in the course of its work on Network tools. However, per the recommendations of several external experts, its advisable that a more comprehensive "end-to-end" security assessment be conducted once these functional specifications take shape and are tested together. Therefore, this Plan calls for such as assessment to be conducted in late 2002 or early 2003.

Chapter 3: Network Technical Infrastructure

Milestones

Table 11: Ensuring Network Security: Milestones

Responsible Party	Milestone	Start Year	Start Quarter	End Year	End Quarter
Board	Establish responsibility and schedule for Network security guidelines development*	2002	Q2	2002	Q2
Board	Commission an independent security assessment of the Network security protocols*	2003	Q1	2003	Q3

* Also in Guiding Network Implementation and Participation

c.   Implementing Data Standards

Overview

As defined by the EDSC, data standards are "documented agreements on formats and definitions of common data." Data standards are established to bring greater consistency and quality to the information that organizations maintain and exchange. They provide the definitions and formats of the individual data elements (or "words"). Data elements alone are usually meaningful only when placed in data groups (or "sentences"); these sentences may be larger groupings of other standards or stand alone standards themselves.

Data standards are especially important tools for data integration and exchange because they allow data from many compliant sources to be integrated. Of course this benefit comes at a (sometimes significant) cost to users by re-formatting (or in some cases re-collecting) data in a compliant format. For this reason, data standards development is usually highly targeted and prioritized on key "linkage" data, such as facility, location, or chemical name.

The benefits of data standards are even greater for Network Partners because they reduce ambiguity of the information contained in Templates at the most rigorous level possible. Templates themselves can act as proxy standards, but they do so only at a more "coarse" level for the exchange package as a whole. The best possible combination, and the vision strived for in this Plan, combines both Templates and data standards, or, more specifically, Templates that are based on data formatted according to data standards.

As with many other Network implementation areas, the development and use of data standards will both inform and be informed by the simultaneous evolution of other Network tools.

The development of data standards takes time because it involves forging a consensus around data meaning. Experience suggests that standards may take more time to develop than Templates, especially where those Templates simply re-package existing information formats. To manage this process, many exchange communities develop a *core reference model* which provides a high-level depiction of the major data groupings and their relationships. This allows standards development to be targeted, while at the same time providing Template developers with guidelines about how the data covered in their Template relates to the whole. This Plan specifies that such a model should be created for core shared environmental data.

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The EDSC will continue to be the primary developer/adopter of relevant data *content or semantic* standards (i.e., those that define key business data). This Plan recommends that the Network's Technical Resource Group (TRG) coordinate with the EDSC to coordinate standards and Templates for the Network. This collaborative effort would include the following:

❑ A standing coordinative mechanism between the EDSC and the Board, and identification of shared priorities for standards development.

❑ Joint development of guidelines on how standards are to be represented in XML and Templates.

❑ The "core reference model" identified above. This model will likely use the existing final and draft standards as a starting point.

Successful exchanges of data are one of the most rigorous indicators of the success and utility of standards. The process of creating Templates and flowing data will inform both the standards and the Template development process.

This Plan calls for the EDSC to complete its Round 3 standards in 2002 and commission new standards (Round 4) per the priorities identified with the Board. These priorities will be shaped by the Flow schedule to ensure that standards are available (where possible) for Templates that need to be created or revised.

Chapter 3: Network Technical Infrastructure

Milestones

Table 12: Implementing Data Standards: Milestones

Responsible Party	Milestone	Start Year	Start Quarter	End Year	End Quarter
Board	Establish core Network reference model for existing and proposed standards (Version 1.0)*	2002	Q1	2002	Q4
Board	Establish core Network reference model (Version 2.0) for existing and proposed standards*	2003	Q4	2004	Q3
Board/EDSC	Publish generic Guidelines on how to represent standards in XML*	2002	Q1	2002	Q3
Board/EDSC	Establish joint framework for division of labor and cooperation**	2002	Q2	2002	Q2
Board/EDSC	Identify joint data standards priorities for 2002-2004 (Rounds 4 and 5)**	2002	Q2	2002	Q3
Board/EDSC	Publish generic Guidelines on how to represent standards in XML*	2002	Q1	2002	Q3
EDSC	Adopt final Round 2 standards**	underway	underway	2002	Q2
EDSC	Launch Round 3 standards teams**	2002	Q3	2002	Q3
EDSC	Launch Round 4 standards teams**	2003	Q3	2003	Q3
EDSC	Launch Round 5 standards teams**	2004	Q3	2004	Q3

* Also in Guiding Network Implementation and Participation and Developing Data Exchange Templates
** Also in Guiding Network Implementation and Participation

d.   Developing Data Exchange Templates

Overview

Data Exchange Templates (Templates) describe and enforce the format and specific restrictions, where applicable, of Network Flows. Templates will be documented and processed as XML Document Type Definitions (DTDs) or XML Schema. Network implementation requires not only that these Templates be developed and used, but that, to the greatest extent possible, they be compatible with each other.

The strategy for encouraging this compatibility will be multi-faceted and long-term. It will include the rapid and regular development of Template guidelines, coordination with the EDSC, and operation of the Network Registry/Repository. In taking this accelerated path, this Plan makes the assumption that Template guidelines and associated functional specifications will "evolve," most of these changes will likely be minor (for example a backwards compatible modification of a Template), but it will have to be planned for. This will present a "change-management challenge," but it is one that is common with private-sector efforts, and is supported by built-in capabilities of the XML family of technologies. Changes to established business practices required by this evolution of Templates will be more challenging.

In 2001, several Network Template milestones were accomplished by the existing IMWG Action Teams. They have established draft Templates for PCS/IDEF, AIR Emissions, facility identification information

and STORET (ambient water quality monitoring). These early experiences have already identified many of the challenges, issues, and opportunities that the broader harmonization strategy will need to address.

As discussed in *Implementing Data Standards*, a community exchanging information should develop, test, and endorse comprehensive, enterprise-wide data standards *before* Templates are developed. The compatibility of Templates is determined in large part by the use of common standards. However, given both the normal pace of data standards development (~ 1.5 years) versus that of a Template (six months or less), there will be many Templates that contain elements that could/should be standardized. Unless all Template development is stopped for two or more years, this will continue to be the case. Note that EPA and State agencies may adopt more aggressive and restrictive policies about internal or contracted XML implementation, but no such binding mechanism exists or is envisioned in this Plan. Instead, the Plan proposes that this dependency be managed/mitigated by having the TRG do the following (see Table 13 for specific milestones):

❑ Work with the EDSC to link standards to their expression in Templates.

❑ Push forward on the development of generic guidelines on how standards are to be incorporated into Templates.

❑ Develop a simple checklist Template developers can use for the best practices established to-date. Revise this checklist as experience is gained.

❑ Develop a core reference model that establishes a high-level framework for how component Templates are related to each other and how data represented in them can be integrated. Participants will be encouraged to use these guidelines as they create, combine, and extend Templates.

❑ Other guidelines and training (see Next Steps below for a complete list).

Per the overall Flow development strategy, this Plan proposes the Board adopt a draft schedule for Type 1 Flow Templates. (Note that this schedule, in terms of both timing and Flows, will not be finalized until later in the first quarter of 2002.) Table 1 on page xi provides this proposed Template schedule.

Due to the fast pace of Network development and the chicken-and-egg relationship between Template development and the development of data standards, the creation of some Templates will outpace the development of some data standards that those Templates might at some point implement. Templates intended to replace existing legacy flat file formats can be created quickly. However, doing so may simply perpetuate awkward formats in a new technology. Participants may elect to use the Template development process to modernize and re-structure (i.e., re-organize, modularize, and extend) the data contained in the Templates. The idea is to balance "doing it right" with "getting it done." Most first generation Flows will be a compromise between these, but the learning that will result from these pilot Template efforts will be invaluable.

See the milestones for Templates in Table 13 on the following page.

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Milestones

Table 13: Developing Data Exchange Templates: Milestones

Responsible Party	Milestone	Start Year	Start Quarter	End Year	End Quarter
Board	Publish Template Guidelines and Best Practices Checklist (Version 1.0)*	2002	Q1	2002	Q3
Board	Publish Template Guidelines (Version 2.0)*	2003	Q3	2003	Q4
Board (TRG)	Develop guidelines for representing data standards in Templates**	2002	Q2	2002	Q3
Partners	Establish Templates for several new Flows that expand the data available from existing national systems	2002	Q1	2002	Q4
Board (TRG)	Implement strategy to coordinate with broader Template development community, EDSC, and related organizations*	2002	Q2	2002	Q3
EPA	Establish Templates for Type 1 Flows identified in draft Template development schedule (Version 1.0)	underway		2002	Q4

* Also in *Guiding Network Implementation and Participation*
** Also in *Guiding Network Implementation and Participation* and *Implementing Data Standards*

EPA will lead the development of Templates for Type 1 Flows. Only EPA can approve (and so indicate in the Registry) which Template may be used to fulfill EPA reporting obligations. Template development will be conducted with State involvement, and in most cases will be executed through jointly-staffed State and EPA teams. This approach is already in action for the Facility, Air Emissions, and Ambient Water Quality Templates. Further, as discussed above, given the need to balance the schedule for Type 1 Flows, EPA may support advance work by interested States and EPA staff to do work on Templates for these Flows.

e. Operating and Supporting the Network Registry/Repository

Overview

The Network Registry/Repository is a website that serves as the official record and location for the Network's Templates. The Registry/Repository will also store other Network documents such as TPAs. Trading Partners will depend upon the Registry/Repository to access the Templates to validate Flows they receive and properly structure Flows they are sending. The Registry/Repository will be used both manually by users to get copies of Templates for implementation, and automatically as Nodes request Template information "on-the-fly" during the process of a data exchange. In addition, the

Registry/Repository will be used to indicate the status of Templates, including their compliance with applicable standards, their acceptance by EPA for Type 1 Flows, and other information. Users anticipate that the Registry/Repository will also provide an ideal way for parties interested in similar Templates to become aware of each other. The Registry/Repository implements an existing specification (ebXML) for the operation of such registries.   Use of this specification should allow for interoperability of Registry/Repository (many others are being created) and eventually support "off the shelf" registry software and services.

In 2002, the INSG established a prototype Network Registry/Repository in partnership with the National Institute of Standards and Technology. The Network Node Pilot Project – Beta Phase (see *Chapter 3: Section j*) successfully used this prototype Registry/Repository to store, and then automatically retrieve the Template used for data validation during the Beta Phase data exchange process.

The Board will identify and select a new host for the Registry/Repository by the third quarter of 2002; options include out-sourcing to a third party or hosting by one member, such as EPA. Operation of the Registry/Repository will be overseen by the Board through its staff, according to Registry/Repository operating procedures developed by the TRG. These procedures will define policies about areas such as who can register Templates, how they will be categorized, and how the process of registration and retrieval will operate. Because the Registry/Repository plays these dual roles of supporting users and supporting automated transactions involving Templates, these Registry/Repository procedures will be tightly coordinated with the Template guidelines development effort and the Network exchange protocol. The TRG will also coordinate the development of a user's guide to the Registry/Repository, and the ongoing coordination of this Registry/Repository with related federal and international efforts.
Finally, the role of companion technologies (e.g., Universal Description Discovery & Integration and Web Services Description Language) should be further explored to determine if they affect the Registry/Repository.

Milestones

Table 14: Operating and Supporting the Network Registry/Repository: Milestones

Responsible Party	Milestone	Start Year	Start Quarter	End Year	End Quarter
Board	Designate a responsible party for overseeing registry operations, including security, coordinating registry efforts and publishing registry Guidelines*	2002	Q1	2002	Q2
Board	Establish a new home for the Network Registry/Repository*	2002	Q1	2002	Q2
Board	Produce Registry Operating Procedures and Users Manual (Version 1.0)*	2002	Q2	2002	Q3

* Also in *Guiding Network Implementation and Participation*

f.   Establishing Network Nodes

Overview

Network Nodes (Highlight 2) are the entry point for Network Partners to the Network. They allow Network Partners to request information from other Nodes, process requests for information, handle errors in requests, access data from a participant's existing information system, and transmit data over the Network. Nodes will use a set of standard Network guidelines and tools to accomplish their tasks. Each Network Partner will be responsible for establishing their own Node and coordinating with their existing

web and information systems architecture. Highlight 8 provides additional technical details about Node architectural components.

Nodes rely on specific requests that allow other computers to access business functionality and their results on the Node.[6] Initially, most Network Partners' Nodes will be servicing requests for information from external Network Partners. These Nodes will specialize in receiving requests, accessing the requested data, and packaging the data for transport back to the requestor.

Developing Node Guidelines and Technology Templates

A Node's architecture is highly modular and severable with respect to Partners' existing systems. In addition, all Node components consist of generic software available from a variety of existing vendors. Early on, State and EPA staff realized that this situation presented the opportunity to develop generic "technology templates" to simplify and support Partner Node implementation. These templates would be pre-configured assemblies of the most common software in use by Partners for databases and web servers. This approach is used by other exchange communities and is supported by the technical experts who were asked to validate the *Blueprint*.

The Beta Phase participants will use their experience implementing Nodes to recommend how and what templates should be developed. Their early experience suggests that the technical options for Node development continue to expand as vendors release new products and existing software stabilizes. Technical options for Node development range from manually configured assemblies of small

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Highlight 8: Description of High-Level Architectural Components of a Node

Network Nodes have the following high-level architectural components:
- *A listener for requests.* Requests and data are currently being packaged in a SOAP envelope for transport. The listener needs to actively access incoming requests to the Node.

- *A request processor.* A tool that unpacks requests for further processing by the XML processor.

- *An XML processor.* Currently requests and data are formatted and defined in XML Schemas. The processor must be able to interpret XML requests, translate requests and data into prescribed XML Schemas, and validate requests and output data against defined XML Schemas.

- *Middleware for data mapping.* Middleware maps the data in the XML Schema to the data in the participant's back-end information system. Not only does it identify the correct data elements but translates data types and formats as needed.

- *Database connectivity.* Database connectivity tools allow software (like middleware) to connect to and communicate with the back-end database.

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components bundled with existing software, to full-fledged e-commerce suites (and everything in between). These options also mean that Partners are also likely to need support when selecting tools from the myriad of existing options.

The Board will commission the development of these templates in conjunction with the development of the Node functional specifications and Network exchange protocols (which will clarify the end-to-end information exchange process). Template development will also be informed through the Network Readiness Assessment to be coordinated by the Board. This Assessment will include identification of the

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[6] According to current industry discussions, these requests may each be considered web services. This issue should be explored and clarified to prevent confusion.

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most common software sets in use and gauge interest in use of templates, which can be used to target development.

Node development should proceed toward the following Network milestones:

❑ Pilot project participants complete Beta Phase and document the results.

❑ The Board develops subsequent versions of issues, options, and lessons learned as more Nodes are implemented. These are to be used as guidelines for additional Network Partners.

EPA's Central Data Exchange (CDX) Node

The CDX Node will operate according to the same exchange protocols as other Partner Nodes. However, the EPA Node presents issues of scope and scale that are unique to its role as a Federal Agency and a recipient of Type 1 Flows. A broad understanding of EPA's overall approach to Node implementation will help its Flow Partners coordinate with EPA more effectively. This section therefore only outlines these dependencies and EPA's broad strategy where they will influence partner decisions. As of early 2002, EPA is still in the process of making many of these decisions as part of its broader enterprise architecture development process. On this basis, many of the details below are presented as assumptions subject to confirmation or modification as EPA's plans are developed.

For the implementation of the CDX Node, this Plan makes the following assumptions:

❑ EPA's CDX Node will be the EPA's primary "information requestor" Node and will be the sole EPA Node authorized to make requests for Type 1 Flows. CDX will also likely be used for most/all Type 2 Flow requests.

❑ CDX may provide "Node on demand" services to Program Offices and Regions (within the EPA firewall) for Type 2 Flows. This internal EPA design decision may influence how Partners collaborate with EPA to execute these Flows. Whatever the internal mechanism, EPA will support Program and Regional staff in establishing Type 2 and Type 3 Flows, as resources allow. This will not be allowed to become a major bottleneck for Flows.

❑ EPA will establish an "information provider" Node (which will most likely be the same Node as the "information requestor" Node), identical to that of other Partners. EPA will eventually provide at least three *kinds* of data over this Node:

 ▪ EPA-stewarded data (e.g., Toxic Release Inventory (TRI)), as a service to other Partners. EPA will be the information provider for these data, and States can interactively retrieve these data.

 ▪ Co-stewarded data, i.e., data where EPA and States share responsibility for some portion of a data set, or where the data set requires coordination of two or more data sources. For example, a master facility record may contain EPA data (e.g., TRI facility information) as well as State data (e.g., State program facility information). EPA would make these data available through its Node.

 ▪ (Non-EPA) Partner-stewarded and provided data as a service to Partners. This might be useful for providing data access to Flow Partners for use in diagnosing/validating Flows, mounting the data on behalf of Partners States who do not (yet) have Nodes, or where limited volume of data does not merit establishing a Node.

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Milestones

Table 15: Establishing Network Nodes: Milestones

Responsible Party	Milestone	Start Year	Start Quarter	End Year	End Quarter
Board	Publish a preliminary manual on "How to establish a Network Node" (based on Node Beta Phase and work done by the "follow on" effort)*	underway		2002	Q3
Board	Publish Network Node Functional Specifications (Version 1.0)**	2002	Q3	2002	Q4
Board	Publish manual on "How to approach establishing a Network Node" (Version 2.0)**	2002	Q4	2003	Q3
Board	Publish manual on "How to approach establishing a Network Node" (Version 3.0)**	2003	Q1	2003	Q3
EPA	CDX ready to receive 3 Type 1 Flows, including complete linkage to the destination National Systems***	underway		2002	Q4
EPA	Prototype EPA Out-Node Operational	2002	Q2	2002	Q4
EPA	EPA Out-Node in production	2003	Q1	2003	Q4

* Also *in Guiding Network Implementation and Participation*

** Also in *Guiding Network Implementation and Participation* and *Connecting the Network to Existing Information Systems*

*** Also in *Connecting the Network to Existing Information Systems*

g.   Refining the Details of the End-to-End Information Exchange Process

Overview

The Network information exchange process begins when a Network Partner[7] sends a valid request for information across the Network. The process ends when a requestor receives either the requested information or a descriptive error message. The exchange process does not include processing or incorporating the result set. Once the requestor receives a response, the exchange is completed. Use of that information is a different business process. Figure 4 (below) provides a simplified depiction of the Network information exchange process.

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[7] At some point in the future, outside parties may request information from Nodes.

Figure 4: The Network Information Exchange Process
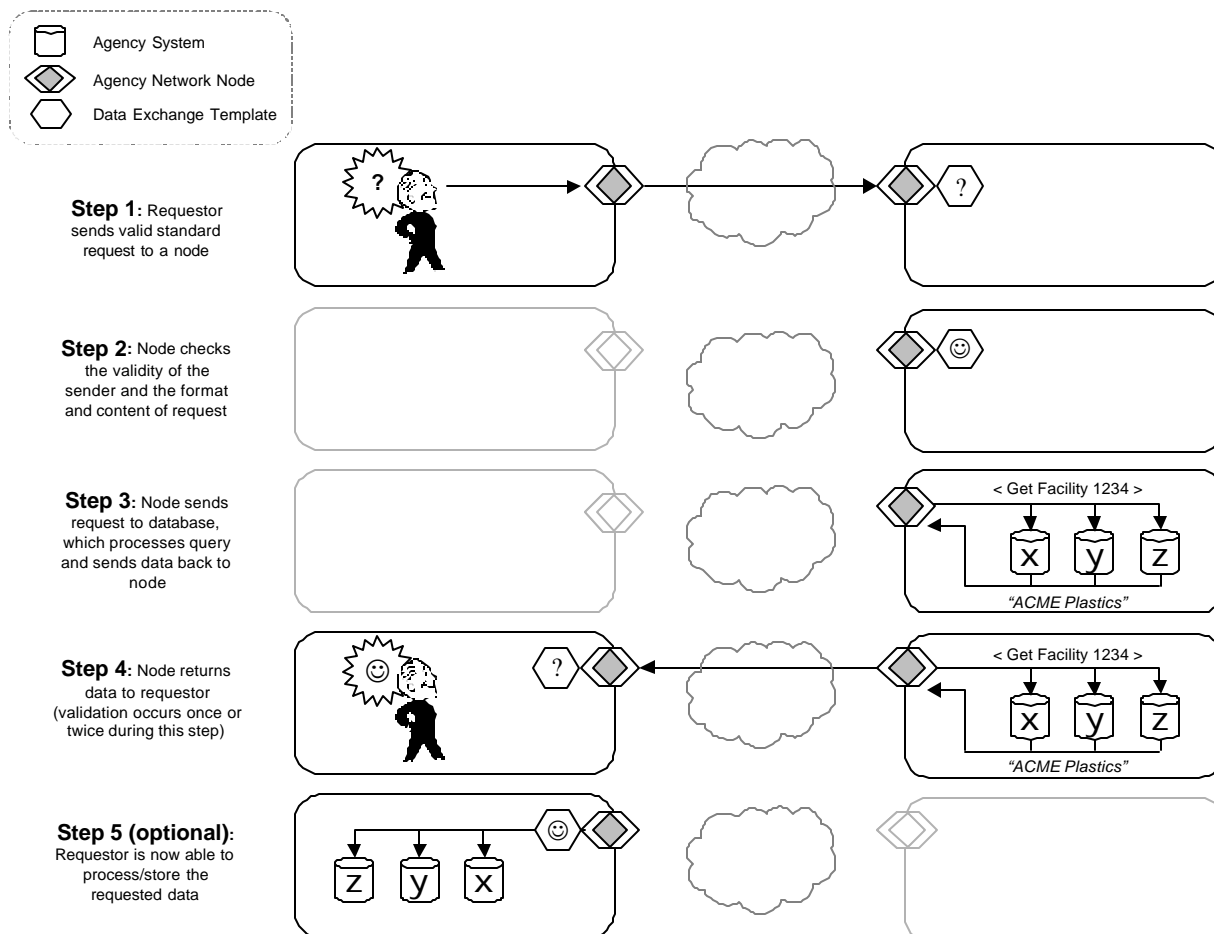
Network interoperability will depend upon the use of a common set of Network exchange protocols – the protocols that set the expectations for the end-to-end information-exchange process. The Board will develop the protocol and corresponding guidelines for use by Network Partners. The protocol will not tell information system managers which or which kinds of requests or responses they should service, only how they should be expressed and described. Given the breadth of data and Network Partners envisioned in the Network, there will also be many kinds of requests and responses developed. For example, early Type 1 Flows, which are intended to replace existing legacy flows, may support only one request (e.g., "please send your monthly national system updates") and one response (e.g., "here is the monthly national system update"). Other Flows, such as the one piloted in the Beta Phase, support multiple requests and responses (e.g., "provide all information about facility number 1234").

The exchange process also raised questions about how to handle various common and re-occurring data exchange issues, such as missing or "not applicable" data and managing errors that might occur at various stages in the process.

Two of the technologies which the protocol should address are described in Highlight 9 below.

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Highlight 9: Using SOAP and WSDL to Specify and Document Flows

In 2001, Simple Object Access Protocol (SOAP) has emerged as a possible up-and-coming "de-facto" standard for structuring requests and response messages, and Web Services Description Language (WSDL) has emerged as the standard for describing the collections of responses and requests which constitute a given Flow (or "service"). Both SOAP and WSDL are based on XML and are now supported by a growing number of major software vendors who are building them into their tools. Some of these tools go so far as to actually generate the code needed to process requests from WSDL.

Milestones

Table 16: Refining the Details of the End-to-End Information Exchange Process: Milestones

Responsible Party	Milestone	Start Year	Start Quarter	End Year	End Quarter
Board	Develop and publish Network Exchange protocols (Version 1.0)*	2002	Q1	2002	Q4
Board	Develop and publish Network Exchange protocols (Version 2.0)*	2003	Q1	2003	Q4
Board	Develop and publish Network Exchange protocols (Version 3.0)*	2004	Q1	2004	Q4

* Also in Guiding Network Implementation and Participation

h. Connecting the Network to Existing Information Systems

Overview and Key Points

The Network interacts with existing systems to generate and service information requests. The flexible nature of Node components allows Partners to customize their approach to connecting with their existing information systems. Node components support a wide variety of data structures, types of information systems, and system architectures. The use of flexible tools like middleware and standard database connectivity options reduces the possibility that existing systems will have to be altered to allow for Network participation.

The relationship between the Network and existing systems becomes more complicated when receiving and incorporating data from other Nodes. Since EPA is likely to be the major consumer of data from early Flows, it will be faced with overcoming these complications relatively soon. Given this challenge, EPA intends to establish an ongoing method for analyzing existing (legacy) flows in relation to EPA's internal systems and integration issues.

Highlight 10: Connectivity with Partner Systems

Connecting the middleware, like any other application, to the back-end systems requires a database connectivity tool. Tools such as Java Database Connectivity (JDBC), Open Database Connectivity (ODBC), and Active Data Objects (ADO) are commonly used as well as native connections that are supplied by database vendors. These technologies are commonly used in agencies for applications development and systems integration.

Existing Partner Information Systems

Network Nodes use two kinds of software to interact with back-end systems. Middleware maps the location, type, and format of data in the back-end systems with the type and format required for the XML Schema. Database connectivity tools communicate between the middleware and the database that houses the Partner's data.

Partners must map their existing data to the agreed-upon Templates using their middleware product. Mapping consists of identifying the location of the data in the back-end database, defining the format of the stored data, and defining the format of the output data (XML Schema). Once the source data and the output data have been defined, the middleware translates from source to output and back.

Partners can participate in the Network regardless of their existing system architecture using these standard tools. Stand-alone databases, data warehouses, integrated databases, and enterprise integrated systems can all be connected to Nodes. While it will always be easier to connect a smaller number of systems to the Node, any stable system that serves as a source of quality data can be used.

Network Partners that have integrated their systems already will be especially well positioned for these connections. However, given the incremental nature of both integration and Flow development, it is likely that most Partners will connect a number of (non-integrated) systems to their Nodes.

Existing technical architecture will determine the specific approach Network Partners will take when connecting their Nodes to their existing systems. Processes for update schedules for databases and warehouses, back-up schedules, and quality control timing will all influence how and when Nodes can access data. While logically straightforward, mapping the middleware to the existing systems is not trivial, it will require planning and staff time.

Connecting a data source to a Node will not change the quality of the underlying data. Nor will middleware and database connectivity compensate for data that is not available or reliable. Partners will need to ensure that required data are collected and screened for agreed-upon quality standards as documented in their TPAs. The low costs associated with Node development should *not* be confused with the management and or business process changes that may be involved in collecting, managing, or using that data with Flow Partners.

EPA System Architecture

From EPA's perspective, establishing Flows (particularly Type 1 Flows) presents several unique technical challenges. EPA will primarily receive early Flows, which will require loading these data into national systems. Because this will require writing data into existing systems, EPA's challenge is different than that faced by other early Network Partners that mostly have to read data from their internal systems. In addition to acknowledging receipt of official data submissions, EPA must also manage error-trapping and messaging back to States, along with associated business rules. These business rules are complex, vary dramatically, and documentation for these processes may be lacking entirely for older systems. Leveraging the inherent error trapping capabilities of XML and the ongoing system modernizations should reduce these issues, but the need will remain for significant investments to link these systems to the Network.

Incorporating incoming Flow data into existing systems poses other issues. Some Flows may incorporate wholesale "delete and replace" operation, while others will require inserting data into a complex relational structure that includes historical data and data from other sources. Replacement of data is relatively simple, but inserts are more difficult, especially for older legacy systems. Simplifying these transactions is an important design consideration for EPA's system modernization. Establishing the business rules and management structure for this loading process will likely be the pacing factor for these Network Flows

(Template development and refinement will be faster). Experience also suggests that States will need to be involved in the development of these business rules, particularly where the rules are complex.

As States begin to build applications that request information from other Nodes, they will face the same issues. Although most of these operations are likely to be simple aggregations, they will still introduce an additional layer of workflow rules.

These are not new challenges; EPA and States have already implemented many e-government projects where actions taken by users on the Internet trigger pre-defined business processes and write data to internal production systems. The Network seeks to tap this experience and empower it with new technology and shared resources.

Milestones

Each Network Partner will develop its own connections to its own back-end systems. As such, there is no need for an overall Network milestone for this purpose. However, based on the Network Node Pilot Project – Beta Phase report, there is a basic understanding of the issues Network Partners are likely to face in this task and how to generally address these issues. .

Table 17: Connecting the Network to Existing Information Systems: Milestones

Responsible Party	Milestone	Start Year	Start Quarter	End Year	End Quarter
EPA	CDX ready to receive 6 Type 1 Flows, including complete linkage to the destination national system	underway		2003	Q4
EPA	EPA's CDX Node able to receive Flows for all National Systems	underway		2004	Q4

i. Monitoring and Developing Recommendations on Network Technologies

Overview

Given the rapid pace of change in information technology, many of the protocols and standards used to implement the Network will evolve and develop over time. It will be important for Partners, with assistance from the Board, to monitor the evolution of the Network technologies and make recommendations for leveraging and improving the Network by incorporating new developments. The Board will establish a process and a responsible party to monitor and recommend Network technologies. Highlight 10 briefly describes a few technical updates based on recent trends. Further, the Board will establish a process to incorporate technology and management solutions into best practices for Network management and development.

Many organizations are involved in evaluating, standardizing, and recommending technology for the Internet and e-business with the goal of improving the performance, capability, and interoperability of Internet technologies. Network Partners can take advantage of the work these groups are doing to monitor trends and new developments in the technologies that comprise the Network. The Board can use a technology monitoring process to recommend sufficiently stable and useful technologies that to Network Partners. This may include the development of "rules of thumb" for assessing the suitability of candidate technologies.

Key organizations whose work should be tracked include the Worldwide Web Consortium (W3C) and the Organization for the Advancement of Structured Information Standards (OASIS). The Board should also track developments of the major horizontal standardization efforts (e.g., ebXML) and vertical market efforts in key areas such as environment and energy.

The Board (or its designee) will oversee this monitoring process and coordinate the development of guidelines and best practices for recommended technologies.

Milestones

Table 18: Monitoring and Developing Recommendations on Network Technologies: Milestones

Responsible Party	Milestone	Start Year	Start Quarter	End Year	End Quarter
Board	Assign a responsible party for developing and disseminating technology trends information*	2002	Q1	2002	Q1

* Also in *Guiding Network Implementation and Participation*

Chapter 3: Network Technical Infrastructure

j. Bringing the Pieces Together: Continuation of Network Implementation Pilots

Overview

The Network Node Pilot Project – Beta Phase (Beta Phase) was a joint State and EPA project to build and test Nodes. It provided a wealth of successes, lessons, and challenges. It also worked. Before the Beta Phase, only proof-of-concept Nodes existed – products of the Alpha Phase. The Beta Phase implemented Nodes with the most current Network standards and components, and culminated with Node transactions between State Network Partners and EPA via the basic Network information exchange process. More importantly, the Beta Phase developed specific recommendations for next steps in Node development that, by the fall of 2002, should take the understanding of Network Nodes to the point where a Version 1.0 Node functional specification can be produced. This functional specification document would, for the first time, provide prospective Network Partners with a definitive target for their Node development efforts, including preparation of requests for proposal from potential technical contractors and the development of cost estimates.

The Beta Phase findings are documented in the Beta Phase results' report.[8] The effort piloted the following Network Tools:

❑ Use of a variety of sophisticated "middleware" products to test and demonstrate interoperability

❑ Implementation of a complex relational Template

❑ Coverage of exchanges with a TPA

❑ Use of the Network Registry/Repository

Equally important to these technical demonstrations was the validation of the approach of using such pilot efforts to rapidly assess these technologies and identify issues. On the basis of this experience, this Plan therefore calls for a follow-on effort, to be defined by the Board (on the basis of the Beta Phase recommendations), and launched immediately. This effort would expand on the goals of the original Beta Phase, strive to accomplish any remaining Beta Phase goals, and include the following objectives:

❑ Support the development by the TRG (or its successor) of the Node Specification Version 1.

❑ Validate the Exchange Protocol Specification.

❑ Define how and when the TRG should develop full-fledged Node technology templates for use by new Network Partners.

❑ Identify target areas for technical assistance in Node Development.

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[8] Exact name to be determined by the next Plan draft

Milestones

Table 19: Continuation of Network Implementation Pilots: Milestones

Responsible Party	Milestone	Start Year	Start Quarter	End Year	End Quarter
Board	Establish a Beta Phase "follow-on" effort*	2002	Q1	2002	Q1
Node Beta Phase Group	Complete Beta Phase and all documentation, including recommendations for the Beta Phase "follow on" effort**	underway		2002	Q1
Partners	Make basic Nodes operational between EPA and 10 Trading Partners***	2002	Q1	2002	Q3
Partners	Make basic Nodes operational between EPA and a total of 35 Trading Partners***	2002	Q3	2004	Q4
Partners	Develop functioning Node prototypes for basic flows in Six Beta Phase States***	underway		2002	Q1
Partners/ Board	Establish 4 additional Partner Nodes (through the Beta Phase "follow on" under the Board)**	2002	Q1	2002	Q3
Partners/ Board	Establish 25 additional Partner Nodes (through the Beta Phase "follow on" under the Board)**	2002	Q3	2004	Q4

* Also in *Guiding Network Implementation and Participation*

** Also in *Defining the Responsibilities of Network Partners* and in *Establishing Network Nodes*

*** Also in *Establishing Network Nodes*

Chapter 3: Network Technical Infrastructure

Chapter 4: Summary of Network Implementation

Overview

The Network is moving from conceptualization to implementation. Since 1998, States and EPA have worked together to create a foundation from which the Network will grow. This Plan contains the "roadmap" of milestones by which the Network Partners will establish an effective and efficient Network. The milestones in this document are the schedule and target objectives for each responsible party to meet over the next few years. The Plan's milestones are high-level –the parties responsible for them will determine the specific details of how to achieve them. The milestones themselves may need to be adjusted over time if they do not fit the pace or progress of the Network. Similarly, the Plan's schedule for the milestones may need to be adjusted, but should only be adjusted in a coordinated fashion as many milestones depend on each other. However, if the responsible parties accomplish the Plan's milestones within the timeframes outlined herein, the IMWG will meet its goal of implementing the Network by 2004.

A brief glance at the Plan's Milestones: "Who, What, and When"

As shown in Figure 5, the Board is responsible for a majority of the Plan's milestones, and the remaining milestones are the responsibility of EDSC, EPA, and other Network Partners. Although the milestones are focused upon technical achievements, an equal emphasis needs to be made by each Partner to build their organizational infrastructure. Lastly, the milestones are designed to "launch the Network," so many of them occur within the first year of the Network.

Figure 5: Network Implementation Plan Milestones: High-level Summary by Responsible Party, Milestone Type, and Time Period

Milestones by Time Period

The table at the end of this section has been organized chronologically. The timelines are organized by year: 2002, 2003 and 2004, and each year has been split into starting and ending quarters for each task. For more information on each milestone, please refer to its "primary section" in the document. Roughly 70 percent of the milestones are to be completed in the first year: 2002. The heavy emphasis on the first year represents the need to test systems, set up new institutions, design standards, negotiate agreements, and establish formats to get the Network started. As with most changes, the initial stages require the most work. About 30 percent of these tasks are already in progress, and some milestones are natural steps of any institution (i.e., hiring staff, creating task-oriented teams, and producing updated versions of guidelines). None of the milestones are "set in stone." However, the responsible parties need to adhere as closely as possible to the timelines to meet the goal of establishing the Network by 2004. Not all of the tasks will require an entire quarter to be completed – some milestones will be easily implemented in conjunction with others (i.e., designating new responsible parties to fulfill Board functions).

Table 20 contains all of the milestones organized by time period. (Pages 44-47)

Table 20: Summary of Implementation Milestones by Time Period

Start Year	Start Qtr	End Year	End Qtr	Respon-sible Party	Milestone	Primary Implementation Section/Area*
underway		2002	Q1	Board	Designate full-time staff to support the Network Steering Board	Guiding Network Implementation and Participation
underway		2002	Q4	Board	Launch the Network Website	Guiding Network Implementation and Participation
underway		2002	Q3	Board	Publish a preliminary manual on "How to establish a Network Node" (based on Node Beta Phase and work done by the "follow on" effort)	Establishing Network Nodes
underway		2003	Q4	Board	Develop 3 Technology Templates for State Nodes	Guiding Network Implementation and Participation
underway		2002	Q2	EDSC	Adopt final Round 2 standards	Implementing Data Standards
underway		2002	Q1	EPA	Publish Schedule for Type 1 Flows for 2002-2003	Developing Network Flows
underway		2003	Q4	EPA	Establish 10 additional Trading Partner Agreements with State Partners	Defining the Framework for Data Exchanges: TPAs
underway		2002	Q3	EPA	Establish 5 Trading Partner Agreements with State Partners	Defining the Framework for Data Exchanges: TPA
underway		2004	Q4	EPA	Establish additional Trading Partner Agreements for a total of 8 Network Flows to National Systems	Defining the Framework for Data Exchanges: TPA
underway		2002	Q4	EPA	Establish Trading Partner Agreements for 3 Network Flows to National Systems	Defining the Framework for Data Exchanges: TPA
underway		2002	Q3	EPA	Publish list of Type 1 Network Flows for 2003 -2004	Defining the Responsibilities of Network Partners
underway		2003	Q4	EPA	CDX ready to receive 6 Type 1 Flows, including complete linkage to the destination national system	Connecting the Network to Existing Information Systems
underway		2004	Q4	EPA	EPA's CDX Node able to receive Flows for all National Systems	Connecting the Network to Existing Information Systems
underway		2002	Q4	EPA	Establish Templates for Type 1 Flows identified in draft Template development schedule (Version 1.0)	Developing Data Exchange Templates
underway		2002	Q4	EPA	CDX ready to receive 3 Type 1 Flows, including complete linkage to the destination National Systems	Establishing Network Nodes
underway		2002	Q1	IMWG	Charter Network Steering Board	Guiding Network Implementation and Participation
underway		2002	Q1	Node Beta Phase Group	Complete Beta Phase and all documentation, including recommendations for the Beta Phase "follow on" effort	Bringing the Pieces Together: Continuation of Network Implementation Pilots

underway	2002	Q1	Partners	Develop functioning Node prototypes for basic flows in Six Beta Phase States	Bringing the Pieces Together: Continuation of Network Implementation Pilots

Start Year	Start Qtr	End Year	End Qtr	Respon- sible Party	Milestone	Primary Implementation Section/Area*
2002	Q1	2002	Q3	Board	Develop an assistance strategy and staffing/organization plan	Guiding Network Implementation and Participation
2002	Q1	2002	Q1	Board	Re-charter, fund, and staff Joint Technical Resource Group	Guiding Network Implementation and Participation
2002	Q1	2002	Q1	Board	Establish a Beta Phase "follow-on" effort	Bringing the Pieces Together: Continuation of Network Implementation Pilots
2002	Q1	2002	Q3	Board	Publish Template Guidelines and Best Practices Checklist (Version 1.0)	Developing Data Exchange Templates
2002	Q1	2002	Q4	Board	Establish core Network reference model for existing and proposed standards (Version 1.0)	Implementing Data Standards
2002	Q1	2002	Q1	Board	Assign a responsible party for developing and disseminating technology trends information	Monitoring and Developing Recommendations on Network Technologies
2002	Q1	2002	Q2	Board	Designate a responsible party for overseeing registry operations, including security, coordinating registry efforts and publishing registry Guidelines	Operating and Supporting the Network Registry/Repository
2002	Q1	2002	Q2	Board	Establish a new home for the Network Registry/Repository	Operating and Supporting the Network Registry/Repository
2002	Q1	2002	Q4	Board	Develop and publish Network Exchange protocols (Version 1.0)	Refining the Details of the End-to-End Information Exchange Process
2002	Q2	2002	Q4	Board	Publish Trading Partner Agreement Guidelines and checklists (Version 1.0)	Defining the Framework for Data Exchanges: Trading Partner Agreements
2002	Q2	2002	Q4	Board	Establish statement of principles for Network Partner responsibilities	Defining the Responsibilities of Network Partners
2002	Q2	2002	Q4	Board	Provide Updated State Network Readiness Self-Assessment	Guiding Network Implementation and Participation
2002	Q2	2002	Q2	Board	Establish responsibility and schedule for Network security guidelines development	Ensuring Network Security
2002	Q2	2002	Q3	Board	Produce Registry Operating Procedures and Users Manual (Version 1.0)	Operating and Supporting the Network Registry/Repository
2002	Q3	2003	Q1	Board	Establish system to assess Network costs and performance measures	Guiding Network Implementation and Participation
2002	Q3	2002	Q4	Board	Publish Network Node Functional Specifications (Version 1.0)	Establishing Network Nodes
2002	Q4	2003	Q3	Board	Publish manual on "How to approach establishing a Network Node" (Version 2.0)	Establishing Network Nodes
2002	Q2	2002	Q3	Board (TRG)	Develop guidelines for representing data standards in Templates	Developing Data Exchange Templates

Chapter 4: Summary of Network Implementation Milestones

IMWG Implementation Plan for the National Environmental Information Exchange Network
February 2002

Start Year	Start Qtr	End Year	End Qtr	Respon-sible Party	Milestone	Primary Implementation Section/Area*
2002	Q2	2002	Q3	Board (TRG)	Implement strategy to coordinate with broader Template development community, EDSC, and related organizations	Developing Data Exchange Templates
2002	Q1	2002	Q3	Board/ EDSC	Publish generic Guidelines on how to represent standards in XML	Implementing Data Standards
2002	Q2	2002	Q2	Board/ EDSC	Establish joint framework for division of labor and cooperation	Implementing Data Standards
2002	Q2	2002	Q3	Board/ EDSC	Identify joint data standards priorities for 2002-2004 (Rounds 4 and 5)	Implementing Data Standards
2002	Q3	2002	Q3	EDSC	Launch Round 3 standards teams	Implementing Data Standards
2002	Q2	2002	Q3	EPA	Develop initial internal Guidelines on roles, responsibilities, and support for Trading Partner Agreement development	Defining the Framework for Data Exchanges: Trading Partner Agreements
2002	Q2	2002	Q2	EPA	Accept facility data from Beta Phase (State) Participants through EPA's Node	Developing Network Flows
2002	Q2	2002	Q4	EPA	Prototype EPA Out-Node Operational	Establishing Network Nodes
2002	Q1	2002	Q1	EPA/ Board	Further define and clarify Flow types	Developing Network Flows
2002	Q1	2002	Q3	Partners	Make basic Nodes operational between EPA and 10 Trading Partners	Bringing the Pieces Together: Cont. of Network Implementation Pilots
2002	Q1	2002	Q4	Partners	Establish Templates for several new Flows that expand the data available from existing national systems	Developing Data Exchange Templates
2002	Q3	2004	Q4	Partners	Make basic Nodes operational between EPA and a total of 35 Trading Partners	Bringing the Pieces Together: Cont. of Network Implementation Pilots
2002	Q1	2002	Q3	Partners/ Board	Establish 4 additional Partner Nodes (through the Beta Phase "follow on" under the Board)	Bringing the Pieces Together: Continuation of Network Implementation Pilots
2002	Q3	2004	Q4	Partners/ Board	Establish 25 additional Partner Nodes (through the Beta Phase "follow on" under the Board)	Bringing the Pieces Together: Continuation of Network Implementation Pilots
2003	Q1	2003	Q3	Board	Commission an independent security assessment of the Network security protocols	Ensuring Network Security
2003	Q1	2003	Q3	Board	Publish manual on "How to approach establishing a Network Node" (Version 3.0)	Establishing Network Nodes
2003	Q1	2003	Q4	Board	Develop and publish Network Exchange protocols (Version 2.0)	Refining the Details of the End-to-End Information Exchange Process
2003	Q2	2003	Q4	Board	Provide Updated Readiness Assessments for Territories, Tribes and other Network partners	Guiding Network Implementation and Participation
2003	Q3	2003	Q4	Board	Publish Template Guidelines (Version 2.0)	Developing Data Exchange Templates

Start Year	Start Qtr	End Year	End Qtr	Respon-sible Party	Milestone	Primary Implementation Section/Area*
2003	Q4	2004	Q3	Board	Establish core Network reference model (Version 2.0) for existing and proposed standards	Implementing Data Standards
2003	Q3	2003	Q3	EDSC	Launch Round 4 standards teams	Implementing Data Standards
2003	Q1	2003	Q4	EPA	EPA Out-Node in production	Establishing Network Nodes
2004	Q1	2004	Q4	Board	Develop and publish Network Exchange protocols (Version 3.0)	Refining the Details of the End-to-End Information Exchange Process
2004	Q3	2004	Q4	Board	Publish Trading Partner Agreement Guidelines (Version 2.0)	Defining the Framework for Data Exchanges: Trading Partner Agreements
2004	Q3	2004	Q3	EDSC	Launch Round 5 standards teams	Implementing Data Standards

APPENDICES

Appendix A: Framework for TPA Guidelines, FAQs and Checklists

(Draft Version 10/16/01)

Overview

This Network Trading Partner Agreement Framework establishes the direction, responsibilities and procedures for the interim and long term development of guidelines for the creation of Trading Partner Agreements. This document is organized in a manner to help the INSG and/or a permanent steering group to manage process. The document includes Frequently Asked Questions, additional rationale, and a TPA checklist to support the initial, short term, collaborative development of TPAs. All of these components will be utilized as part of the framework for TPA guideline development.

Framework for TPA Guideline Development

The overall purpose of Network TPA guidelines is to provide a common reference point for Network partners seeking information on how to create and execute a TPA. The TPA guidelines are envisioned as dynamic resources for Network Partners that will evolve with ongoing TPA creation, Flows and other Network activities. Development of TPAs in more areas and between more partners, along with experience gained from pilot flows and Template creation, will provide useful lessons that states and EPA can adopt into the guidelines and checklists.

Given the quick pace at which certain Network components are emerging (e.g., the prototype Registry/Repository, EDSC data standards and the first Templates) and the initial progress that has already been made in establishing TPAs, the need exists for both an interim strategy for TPA guidelines as well as a longer-term plan for development of detailed guidelines over the next year.

Short-term Steps

The recommended interim strategy for the Interim Network Steering Group includes maintaining and updating the FAQs and checklists for TPAs as experience is gained through development and practical implementation. The FAQs, checklists, templates and example TPAs would be made available as soon as possible through the prototype Network registry.

2002 Plan

The longer-term plan for TPA guidelines involves development of guidelines through a collaborative process of State environmental agency, EPA Headquarters, and EPA Regional representatives. Without specific information on the formation of a permanent Network steering group or other Network

administration functions, the TPA group does not have a more detailed proposal for roles and responsibilities for preparing the guidelines. In general, State agencies would provide States' perspective on how to create TPAs and what states want to see included in the agreements. Regions would participate in guideline development as potential signatories and direct partners in data exchange with states. The perspective of EPA program offices is needed to involve EPA's regulatory and other business needs around data collection that should be considered in TPA development. EPA's Office of Environmental Information could play a crucial role in guideline development as a potential source of national coordination across programs.

The TPA guidelines should include the following topics:
- Purpose and scope
- Options for format
- Parties to involve
- Steps to create
- Descriptions of the content
- Templates, boilerplate language and checklists of key provisions

It is recommended that the TPA guidelines be drafted and issued no later than Spring/Summer 2002 and updated as needed thereafter.

TPA Frequently Asked Questions

For more information on the responses to these FAQs, see the following section on "Additional Rationale.")

Definition and Relationship with Existing Agreements and Authorities

1. What are Trading Partner Agreements (TPAs)?

A Trading Partner Agreement (TPA) defines the partners, information, stewardship, security, and other items essential for the exchange of information between two or more trading partners on the Network. A TPA will exist as or can be defined as a stand alone-document, an addendum or supplement to an existing agreement, or contained within an existing agreement.
If existing agreements and their amendments satisfy the minimum set of elements that document the content and process of a data flow, then a separate, stand-alone document is not required. The options for TPAs are:
- A. A new agreement is created and signed for a new data exchange not covered in existing agreements (i.e., This agreement would contain all of the items identified in the TPA component checklist.)
- B. An addendum is attached to an existing agreement covering those items in the checklist that are not in the parent agreement. The addendum would include specific information on data exchange between the parties to the agreement that have been identified as core TPA features, such as data elements, exchange format and protocol, timing and frequency, stewardship, and contact information.
- C. All items that are listed in the TPA component checklist are covered in an existing agreement between EPA and States (PPAs, PPGs, MOUs, etc.).

NOTE: "TPA" will be used in the rest of the document to represent any of these 3 options.

2. Can TPAs involve more than two partners?

Yes. The partners themselves would decide the number of signatories/partners needed for the particular TPA documenting an information exchange. All parties should understand and approve the basic

provisions of the TPA that are the same for two-party agreements, including format, timing, data to be exchanged, and other elements outlined in the checklists.

3. Will flows of data that are not required by law be covered by TPAs?

Yes. Groups of states, and states and EPA, may choose to exchange data not covered by an existing mandate or regulatory authority, for purposes of making joint decisions and taking joint action on environmental problems. The initial vision for the Network and the Trading Partner Agreements that govern its exchanges involves the exchange of regulatory data between states and EPA. However, the development of a TPA registry/repository will provide other agencies interested in collaborating on non-regulatory, voluntary data flows access to examples and templates that can be adjusted to fit these types of flows.

Scope and Content of the TPA/Consistency/Additional Burden

4. What is the scope of a TPA and how much detail needs to be included?
5. How will reasonable national consistency among TPAs be achieved while allowing adaptability for each State?
6. Won't the added paperwork and management effort of creating TPAs for all regulatory flows add a large burden to states?

Templates, boilerplate language and checklists will be available to make TPA development as efficient and easy as possible. These documents, available to all partners through an envisioned TPA registry/repository, will form the basis of consistency across partners and programs, while allowing for adaptation by partners and programs for particular needs. Areas where these templates and checklists will be created include:

1. Checklists for recommended components to be included in a TPA
2. Templates for the format and structure of the agreement or addendum
3. Suggested language for certain commonly used text in the agreement or addendum
4. Checklists for required data elements for major programs that should be included in agreements.

7. Do record retention provisions need to be specified in a TPA?

Traditionally defined record retention issues, such as maintenance of paper copies and historical data, need not be specified in a TPA.

Relationship with Network Development

8. What is the role of the INSG or a permanent Network Steering Group in TPA creation and management? Who is in charge?

The role of the INSG and/or a permanent Network Steering Group, if created, is to provide overall guidance and recommendations on development and general content of TPAs. As stated in the Network Blueprint, it is not expected that a steering group (or any managing body) would manage, approve or oversee every TPA or be involved in settling disputes between partners to an agreement. These responsibilities would be left to the individual partners and programs involved in the TPA.

9. Will the process of TPA development inhibit Network development or execution of Network flows?

TPA development is an evolutionary process and a process that should not restrict development of other Network components or flows. It is conceivable that developing a TPA and a node or Network exchange

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should be done concurrently. This concurrent process would allow partners to explore options of a Network exchange and how best to document that exchange.

Agreement Title

10. Why use the term "Trading Partner Agreement?"

"Trading Partner Agreement" is already a commonly used and recognized term associated with the Network. A proposal has been presented to expand the agreement name to "Trading Partner Agreement for Environmental Information". This title clarifies the agreement content and type of data being exchanged, which helps distinguish the agreement from other agreements.

TPA Guidelines

11. How will potential partners obtain information on developing TPAs and what should be covered in an agreement?

The Network Steering Group, if created, will sponsor creation of TPA guidelines that will define basic policies and procedures. The guidelines will also provide checklists and templates examples or direct partners to existing agreements.

Additional Rationale

Definition and Relationship with Existing Agreements and Authorities

- **The flexibility to build off existing agreements will allow States and EPA to avoid the creation of new legal relationships that may create additional burden.**
- **An addendum and/or appendix would be easily updated and adapted as needed without having to change the full agreement, thereby minimizing burden.**
- Working within existing agreements helps to ensure consistency among these agreements and evolving data sharing relationships
- TPAs should be developed to support non-regulatory exchanges and provide similar benefits of structure, consistency and documentation as TPAs will provide for regulatory data. For example, Nebraska's TPA with EPA Region 7 for facility identification data and the CDX Action Team's work to develop a Template for State/EPA exchange of water quality data are included in this category.
- These flows would expand the data on the Network beyond the flows to EPA.

Scope and Content of the TPA/Consistency/Additional Burden

- Development of TPAs will require additional investments, but this cost must be considered within the larger context of the improved efficiency and expanded services supported by the Network.
- Templates and checklists will promote consistency among TPAs.
- Templates and checklists will ease the burden for partners who wish to create new TPAs.
- Data element checklists for TPAs for major program areas, developed in conjunction with Templates in these areas, would also promote consistency and facilitate TPA development by simplifying the process of determining what data should be covered. These checklists can be easily developed based on lists of national system requirements that already exist. At this point, informal sharing of TPA language and data elements is taking place, but it is anticipated that TPAs, templates, and checklists would eventually be posted on the Network registry/repository for use by interested parties.

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- Note: Partners can be strongly encouraged to use the suggested elements, but no authority for enforcement of TPA contents exists beyond the negotiations of the partners themselves.
- Issues such as records of electronic transactions or maintenance of historical data may be a part of a TPA, but these records and paper derivatives of electronic transactions are often covered by existing laws or agreements and do not need to be repeated in a TPA.
- Electronic records retention and management policies are or will be developed separately. This area is likely to see new broad policies at both the State and Federal level.

Relationship with Network Development

- At this early state of Network implementation, simultaneous development of data standards, Templates, TPAs and data flows is occurring. This requires flexibility in how and when TPAs are created and for which flows.
- TPAs are expected to be modified over time as experience with data flows is gained. The ability for agreements to evolve as the Network evolves is important for their success.
- EPA, in cooperation with States, should begin to establish goals for flows and development of their associated TPAs.

TPA Guidelines

- Documentation of the decisions and policies of the INSG on TPAs provides a common reference point for both future Steering Group activities and Network partners seeking guidance on TPAs.
- Distribution of TPA guidelines minimizes the burden of partners creating new TPAs by providing information on when TPAs are needed, how to create a TPA, and suggestions for what should be included in an agreement.
- Guidance through templates and checklists helps ensure that TPAs are consistent across agencies and programs, which helps to maintain quality and usefulness for business processes.
- TPA Checklist

Below is an initial list of the recommended components to be included in a TPA, alone or in combination with existing agreements. This will be expanded as more formal TPA guidelines are developed.
- ❑ Define the partners
- ❑ Define the purpose
- ❑ Background, why this is done
- ❑ Define the benefits of this exchange
- ❑ Define partner roles and responsibilities
    - o Data stewardship
    - o Environmental Program (interest) responsibilities
- ❑ Document authorities and policies
- ❑ Trading Partner Agreement
    - o Data access
        - ▪ Define what data
        - ▪ Define exchange schedule
        - ▪ Define how to make available
    - o Metadata
    - o Standards
    - o Data
        - ▪ Available how
        - ▪ Reconciliation process
    - o Technology
    - o Security
- ❑ Financial arrangements

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- ❑ Period of agreement and termination
- ❑ Data ownership and rights of the partners
- ❑ Points of contact
    - o Primary contacts
    - o Support contacts
- ❑ Approvals/Signatures

Appendices

Appendix B: NSB Charter

(Version 2/5/02)

Background

The State/Environmental Protection Agency Information Management Workgroup (IMWG) approved the *Blueprint for the National Environmental Information Exchange Network* describing the National Environmental Information Exchange Network (Network) in October 2000, and endorsed the Interim Network Steering Group (INSG) charter in February 2001. One charge of the INSG charter was to develop recommendations on the establishment of a more permanent home for Network steering. This Network Steering Board Charter establishes a Network Steering Board (NSB), which will support the Network once the INSG sunsets.

Mission

The mission of the Network Steering Board (NSB) is to steer Network participants' implementation of the Network towards success, and to manage the administration and support of the Network to ensure that it is effective, impartial and responsive to all Network participants.

Functions

The Network Steering Board will fulfill the following functions.

- Oversee and steer implementation of the Network including: tracking and reporting to the IMWG on milestones and issues outlined in the Network Implementation Plan, coordinating with IMWG Action Teams those activities that relate to Network implementation, and developing Network performance measure indicators and using them to evaluate the Network.

- Maintain and operate a Network Registry / Repository.

- Develop guidelines and best practice recommendations on the following topics.

  - ❑ Template development and core reference model
  - ❑ Use of Environmental Data Standards Council (EDSC) data standards in Templates
  - ❑ Support of broader harmonization and consistency of Network Templates with each other and with other standards
  - ❑ Messaging protocol specifications, security operations, and other technical elements
  - ❑ Trading Partner Agreement (TPA) development, including TPA templates, checklists and guidelines

- Coordinate and provide <u>Network-related technical assistance</u> to Network partners.

- <u>Promote Network participation, conduct communications (outreach and inreach), and act as a liaison with external groups</u>.

Scope

The Network Steering Board's scope is limited to issues of joint Network policy, procedures, and the administrative support needs of Network operation. The NSB's domain is restricted to the interaction between the nodes of the Network participants (i.e., the NSB's domain does not include what is internal to a Network partner, its node, or information management systems). The NSB is focused on ensuring that participants can use the Network for their own purposes. It includes all Network administration functions such as operation of the Network Registry/Repository, recommendations for Network Templates and TPAs, and other joint technical infrastructure features. The following areas are related to the Network Steering Board's work but are **not** within its scope:

- Decisions on broad issues of State and EPA information management, including **what** information is collected by or exchanged between industries, local governments, States, and EPA, or **how** that information is used (The IMWG, which has a broader scope than the NSB, will continue to engage these issues on behalf of States and EPA.);

- Formulation of policies internal to a Network partner;

- Bi-lateral disputes or debates over data, its use (e.g., will it be flowed over the Network or not), or conditions of TPAs as they are developed between participants; and

- Internal management of individual Network partners' infrastructure, nodes, and information management systems.

Membership

The initial Network Steering Board (NSB) has two Co-Chairs (one EPA, one State), three State representatives and three EPA representatives. State representatives are selected through the Environmental Council of States Data Management Committee, and EPA members are selected by a means defined by the EPA. NSB members serve a term of two years. Terms are staggered to provide continuity of membership. Chairs encourage that the membership represents both technical and programmatic policy backgrounds. Given the responsibilities and fiscal authority of the NSB, members should be senior executives or managers. As dictated by experience and interest, the NSB will seek to include Tribal and local government membership and representatives of other future Network participants.

Authority

The Network Steering Board is established under the authority of the IMWG, to whom it will report. The NSB is the *sole* joint policy decision-making body for Network steering and administration. No policy adopted by the NSB can bind Network participants unless a participant chooses to adopt those policies. Policies, procedures and technical protocols established by/under the NSB have the status of "Network

Steering Board Recommendations." This approach is modeled after the World Wide Web consortium, which establishes widely adopted technical recommendations for core Network technologies such as XML. Network Steering Board Recommendations are available for all potential Network partners and do not require approval by the IMWG.

Decision-Making

Decisions are made by consensus of the NSB whenever possible. The composition of the initial NSB is "evenly" divided between EPA and States with the presumption that proposals must have a clear majority to be approved. This is appropriate given that NSB policies are technically "Network Steering Board Recommendations," which are not binding on any participant. At decision points, all members must participate. If an NSB member is unable to participate, the respective co-chair must obtain a proxy position.

Management Relationships

The NSB funds and directly oversees and manages Network administration and support. In addition, the NSB:

- Reports to the IMWG regularly on progress towards the milestones established in the Network Implementation Plan;

- Coordinates with the IMWG to ensure that, as Network implementation proceeds, the division of responsibilities between the IMWG, its Action Teams, the EDSC and other groups is as clear as possible; and

- Coordinates and works directly with the EDSC on data standards and Data Exchange Template guidelines

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Appendix C: Definitions and Abbreviations of Terms

Note: This appendix is still under development.

ADO – ActiveX Data Objects. A database connectivity tool based on Microsoft's ActiveX technology.

AIRS AQS – Aerometric Information Retrieval Air Quality Subsystem. One of the National Systems of the Environmental Protection Agency.

AFS – AIRS Facility Subsystem.

BRS – Biennial Reporting System.

Blueprint – The Blueprint for a National Environmental Information Exchange Network (Blueprint) provides a conceptual design for the Network. The Blueprint document can be accessed at http://www.sso.org/ecos/eie/COMPLETE_BLUEPRINT_JUNE_01_FINAL.pdf.

Board – The Network Steering Board.

CDX – EPA's Central Data Exchange. CDX is a centralized electronic report receiving system that will serve as EPA's enterprise-wide portal to the National Environment Information Exchange Network.

Digital Certificate – A Digital Certificate, or Digital ID, is a means of verifying identity on the Internet. A third party company, known as a Certificate Authority, will research a group or individual and issue a Digital Certificate to them, vouching that they are who they say they are. This is a way to protect sensitive data by ensuring that others do not impersonate your site and accept or transmit data on your behalf.

DTD – A Document Type Definition (DTD) is an optional list of rules (markup declarations) to which a document or class of documents must conform, including information about what markup is valid in the document and the document's structure.

ebXML – Electronic Business XML initiative. ebXML is a modular suite of specifications that enables enterprises of any size and in any geographic location to conduct business over the Internet.

eDMR – Electronic versions of Discharge Monitoring Reports, which are submitted to EPA under the Clean Water Act.

EDSC – Environmental Data Standards Council (EDSC) develops environmental data standards to promote the exchange of information among States, Native American Tribes, and EPA. The Council identifies those areas of information for which having standards will render the most value in achieving environmental results, prioritizes the areas, and pursues the development of data standards.

EPA – U.S. Environmental Protection Agency.

Extensible – A language or object that can be extended and adapted to meet many different needs.

Flow or **Network Flow** – The routine use of the Network to satisfy a business need for exchanging specific information (and replace a legacy flow if one existed) between two or more Network Partners.

FRS – EPA's Facility Registry System. (http://www.epa.gov/enviro/html/facility.html)

HTML – HyperText Markup Language.

HTTP – HyperText Transfer Protocol (HTTP) is a protocol used to request and transmit files, especially webpages and webpage components, over the Internet or other computer network.

HTTPS – A secure version of HTTP. Simply it is SSL underneath HTTP.

IDEF – Interim Data Exchange Format.

IMWG – State/EPA Information Management Workgroup (IMWG). Composed of senior leaders from EPA and State environmental agencies, the IMWG has initiated an approach to address joint information management in the form of a National Environmental Information Exchange Network   (Network). (http://www.epa.gov/oei/imwg/)

INSG – Interim Network Steering Group (INSG). This group sunsets in January 2002.

Interoperability – The ability of software and hardware to communicate between multiple machines from multiple vendors.

JDBC – Java Database Connectivity.

Middleware – a broad array of tools and data that help applications use networked resources and services.

MIME – Multipurpose Internet Mail Extensions.

NEI – National Emissions Inventory.

Network or **The Network** – The National Environment Information Exchange Network.

Network Grant Program – National Environmental Information Exchange Network Grant Program.

NIST – National Institute of Standards and Technology.

Node – A set of tools to exchange information on the Network. A node uses the Internet, a set of standard protocols, and appropriate security measures to issue and respond to authorized requests for specific information. A Node is a simple environmental web service that initiates requests for information, processes authorized queries, and sends the requested information in a standard format (XML). A Node also validates this information against a pre-defined Schema or Data Exchange Template (Template or DET).

Node Pilot Project – The Alpha Phase -- A pilot project conducted in the spring and summer of 2001. The project developed "proof of concept" Network nodes using XML technologies, demonstrating that these technologies could be used to build nodes as described in the Blueprint. Four States (Delaware, New Hampshire, Nebraska, and Utah) initiated and executed the pilot.

Node Pilot Project – The Beta Phase -- Currently in progress, it continues the work begun during the Alpha Phase and establishes end-to-end flows with EPA, uses a revised comprehensive Data Exchange Template for facility data, and will inform draft specifications for node implementation.

NPDES – National Pollutant Discharge Elimination System.

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OASIS – Organization for the Advancement of Structured Information Standards. Their home site is http://www.oasis-open.org/. The DTD repository they sponsor is at http://www.XML.org.

Partners – Network Partners are participants in the Network. Network Partners can be States, U.S. Territories, Tribes, and EPA or other organizations that share data over the Network.

Plan or **The Plan** – Network Implementation Plan.

PCS/IDEF – Permit Compliance System/Interim Data Exchange Format.

RCRIS – RCRA information System RCRAInfo.

Registry or **Network Registry** – a web site that serves as the official record and location for the Network's Data Exchange Templates, and TPAs.   Trading Partners will depend on the registry to access other Nodes' information and exchange parameters.

Schema – A database-inspired method for specifying constraints on XML documents using an XML-based language. Schemas address deficiencies in DTDs, such as the inability to put constraints on the kinds of data that can occur in a particular field (for example, all numeric). Schemas are hierarchical and can create an unambiguous specification. They can also determine the scope over which a comment is meant to apply.

SDWIS – Safe Drinking Water Information System.

SOAP – Simple Object Access Protocol (SOAP). SOAP is an XML/HTTP-based protocol for accessing services, objects and servers in a platform-independent manner.

SSL – Secure Sockets Layer (SSL) created by Netscape Communications, also known as secure server, provides for the encrypted transmission of data across the Internet. Users on both sides are able to authenticate data and ensure message integrity.

STORET – Water Quality Information System (STOrage and RETrieval).

Templates or **DETs** – Data Exchange Templates are empty but defined templates for data presentation and exchange. They identify what types of information are required for a particular document (i.e., name, address, etc.) as established in predefined standards or agreements.   Specifically, Templates are typically either DTDs or Schemas.

TPA – Trading Partner Agreement (TPA) defines the partners, information, stewardship, security, and other items essential for the exchange of information between two trading partners on the Network.

TRG – State/EPA Technical Resource Group.

UDDI – Universal Description, Discovery, and Integration. UDDI provides mechanisms to discover and publish the existence and availability of a web service. Its main driver is to enable business-to-business interaction through web services.

W3C – World Wide Web Consortium (W3C) is an industry consortium that promotes standards for the evolution of the Web and interoperability between WWW products by producing specifications and reference software. Although industrial members fund W3C, it is vendor-neutral, and its products are freely available.

Web Services – A web service is software that exposes very simple functionality of business applications through the Internet.   Web services communicate with other web services via standards-based

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technologies that can be accessed by trading partners independent of hardware, operating system, or programming environment.

WSDL – Web Services Description Language. WSDL defines the beginning and end point of a service that allows other computers to access and invoke its function. WSDL provides other computers the structure to determine what a web service does, what a web service needs to work, and how to invoke it.

XKMS – XML Key Management Specification is a technology for providing data security in XML.

XML – eXtensible Markup Language (XML) is a markup language defined by the W3C that provides a strict set of standards for document syntax while allowing developers, organizations, and communities to define their own vocabularies.

XQL – Extensible Query Language is a query language that uses XML as a data model.

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